ECOLOGICAL SURVEY OF THE ROUGE VALLEY PARK

S. VARGA, J. JALAVA AND J.L. RILEY

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ECOLOGICAL SURVEY OF THE ROUGE VALLEY PARK

SUMMARY

The Rouge Valley Park study area (2265 ha) encompasses the valleys of the Rouge River and Little Rouge Creek, and the tablelands between them and east towards Petticoat Creek, south from Steeles Avenue to Lake Ontario. These lands and waters in the City of Scarborough and the Town of Pickering are predominantly owned by the Metropolitan Toronto and Region Conservation Authority and the Ontario Ministry of Government Services, with smaller holdings by the Ministry of Transportation, Ontario Hydro, other utilities and a number of private owners.

The lower Rouge valleys have been long recognized as a significant natural area, and were recommended as a large-scale wilderness parkland and nature reserve as early as 1956. Over the past decade, twenty-one environmentally significant areas, two provincially significant wetlands, eight provincially and regionally significant areas of natural and scientific interest, and a major Carolinian Canada site have been identified within the park.

Following the announcement of the Rouge Valley Park by the Provincial Government in 1990, the Rouge Valley Park Advisory Committee requested that the Ministry of Natural Resources expand a life science inventory and evaluation of the area, which was already underway, into a comprehensive resource document in support of informed management planning of the park.

The natural heritage of the Rouge Valley Park is significant to the region and the province. Collectively, the natural areas of the lower Rouge valleys, lakeshore marshes and adjacent tablelands form the most significant system of linked natural areas along any of the lower river valleys draining into northwestern Lake Ontario. The natural areas of the park comprise the largest core natural area, by far, of any park in the Greater Toronto Area or in site district 7-4.

The Rouge Valley Park also represents one of the only remaining large corridors of natural open space extending from the northwestern shores of Lake Ontario into the interiors of Halton, Peel, York, Durham or Metropolitan Toronto. South of Highway 401, this corridor averages 0.7 km in width and, north of Highway 401, the valley-to-valley corridor averages more than 2 km in width, with an additional 1.5 km of tablelands eastward to the headwaters of Petticoat Creek.

The fortuitous coincidence of public acquisition, significant features and passive management for the past three decades has preserved the present option of having a nationally significant park along the lower river valleys of the Rouge. The objective of this study was the documentation and evaluation of the life science features of the park area.

This study has built on the considerable number of detailed resource inventories that have been undertaken by public agencies and private individuals over the past twenty years. Field studies concentrated on the flora and vegetation communities of the park, its breeding and migrant avifauna, and its resident fish, mammal, reptile and amphibian communities. The report documents the distribution and composition of 110 native vegetation communities (dominance types) with a wide variety of soils, topographies and moisture regimes. These ecosystems comprise over 762 plant species, and support 225 bird species (123 breeding species), 55 fish species, 27 mammal species, and 19 reptile and amphibian species.

This biodiversity would be considered outstanding anywhere in Canada, and is all the more significant considering the location of the park in the most heavily developed region of Canada, in Metropolitan Toronto. Notable in particular are: six nationally rare and 92 regionally rare plants; five nationally rare breeding birds, four other breeding birds of special concern, and numerous locally rare, area-sensitive, raptor and colonial birds; two nationally vulnerable fish; and numerous locally rare reptiles, amphibians and mammals. Many of the vegetation communities are among the best examples of these features in the site district; for example, the

lakeshore marshes, the riverside meadows, several oak and pine forest types, and the valley terraces dominated by Black Maple forests.

The Rouge Valley Park is located at the northern edge of the eastern deciduous forest region, also called site region 7, and the Carolinian life zone. Numerous significant plant and animal species and communities are near their northern limits on the south-facing, warm slopes close to Lake Ontario, which significantly moderates the local climate. On the steep, cool north-facing slopes, and in perched tableland swamps away from the lake, however, more northern species and communities occur.

The earliest records of the area, including original survey notes from the 1830s, were assembled to characterize the area before European settlement. Very similar forest types occur in the park today, except that they are mostly only 130-155 years old, dating from the period of widespread forest clearing. These constitute old-growth forests in the regional context, although the frequency of superstorey White Pine and Hemlock has diminished since the pre-settlement era. These longterm changes, and quantitative studies of fourteen varied forests stands, provided insight into the natural processes of community succession in the park, where a full range of successional communities are well expressed.

These records were combined with a review of aerial photography of the lakeshore marshes since 1931 to assess the dynamics of the marsh and the lakeshore ecosystems. This was of particular concern because of the progressive decline of the marsh's aquatic vegetation and the decline of water bird species like Black Tern and Common Moorhen since 1973. Changes in the marsh ecosystem were correlated with the changes in Lake Ontario water levels since the 1930s. This analysis documented the cyclic dynamics of increasing emergent marsh cover during periods of low water, and decreasing cover during high water levels. However, it doesn't fully explain present marsh conditions, such as the very high turbidity levels and the associated dieback of submergents. Other factors, such as the prolonged high water levels in recent years and increased sediment loadings from upstream in the watershed, are postulated as compounding factors. A similar analysis was made of the cyclic factors responsible for the maintenance of the small, but significant natural lakeshore plant communities immediately east of the rivermouth in the park.

The evaluation of the documented features and landscape processes was based on current concepts of ecosystem conservation, such as representation of typical landscapes, biodiversity, ecological functions, the condition of the area, and its special conservation features.

1) From the point of view of the provincial objective to protect provincially significant elements of the natural landscapes of Ontario, the study confirmed the significance of the lower Rouge River valley system as the site best representing two of the dominant vegetation and landform themes of the ecodistrict (or site district), specifically Lake Ontario shoreline wetlands and river valley systems of the glacial Lake Iroquois Plain and South Slope physiographic regions.

2) The concept of diversity in natural ecosystems is a unifying concept in conservation biology. Diversity confers on natural areas ecological stability, regenerative capability and resistance to disturbance. In terms of the diversity of species, community composition, habitat niches, moisture gradients, community structure, successional states, and community interspersion, the Rouge Valley Park is highly significant.

3) The ecological functions and processes documented in the park are similarly diverse. These functions and processes relate directly to the park's mosaic of natural landscapes, and their degree of fragmentation, connectedness, size and shape. They also relate to present and potential natural corridors within the park, to stream and river functions, and to species that are particularly area-dependent or habitat-specific. These considerations are particularly important to the design of potential nature reserve zones within the park.

4) The condition of vegetation communities and some species populations was evaluated with respect to the degree of site disturbance, primarily those associated with human activities. While such impacts have been documented in detail throughout the park, overall, most of these impacts have been 'healed' over time by rapid forest regeneration, free-flowing rivers and predominantly passive land uses during the past 30 years. This is especially true of the park south of the CPR line, where cross-valley transportation and utility routes are less

frequent and where the majority of the land was never broken for agriculture. North of the CPR line, the fragmentation of natural areas by roads, hydro lines and agriculture is much more pronounced.

5) Finally, the study area was evaluated in terms of its special features, primarily its rare and unusual plant and animal species, and vegetation communities. As indicated above, the park clearly contains a remarkable diversity of special features, even more significant because of their location in the heavily developed Greater Toronto Area.

This evaluation of the inventory led to the reconfirmation and mapping of a provincially significant Area of Natural and Scientific Interest (ANSI) in the park (810 ha). This large area, with as compact a shape as possible in the valley context, is organized around the two major river valley corridors and connected laterally between valleys across slopes and tablelands. It includes most of the significant communities, habitats and species of the park, from near the CPR line south to Lake Ontario, with the notable exception of the Metropolitan Toronto Zoo and its parking and access facilities near Meadowvale Road.

The other remaining, less connected natural areas are also mapped in detail as important core natural areas (245 ha). To link them to each other and to the rivers and tributaries, potential restoration areas are mapped between them (315 ha). These potential restoration areas are considered the minimum areas necessary to effectively link the more isolated, remnant natural areas within the park, and they are oriented largely to the major river valleys and to the tributaries of Little Rouge and Petticoat Creeks.

Management recommendations are made in this report, to contribute to the public and agency discussions that will result in a Rouge Valley Park management plan. The major observations and recommendations are summarized as follows.

1) The authors commend the public agencies and private landowners who acted as stewards of the natural heritage of the park for the past 35 years.

2) It is recommended that the goal of natural heritage protection and management adopted by the Rouge Valley Park Advisory Committee (June 1991) be applied to the park as a whole; 'To protect and restore the natural ecosystem of the Rouge Valley Park, and promote the health and diversity of the park ecosystem, its native species, landscapes and ecological processes.' Practically speaking, this should be based on the collection and maintenance of base-line data on the natural features and processes of the park, and a commitment to environmentally sensitive site planning and appropriate park zoning, and to formal monitoring over time to assess the acceptable levels of change resulting from specific park activities.

3) It is recommended that the area identified as the life science Area of Natural and Scientific Interest be managed as a nature reserve zone, and that the other mapped natural areas also be managed as discrete nature reserve zones in the park.

4) Ecosystem succession and the potential for restoration should be important themes in the management of the fragmented landscapes of the park. Priorities for restoration initiatives are recommended, based on the principles of using native species, of local provenance, modelled on local vegetation communities, with preference shown for passive restoration based on natural regeneration.

5) Past activities in the park have left residual negative impacts, for which specific mitigative recommendations are made.

6) To address external influences on the park, natural heritage stewardship by the public and by adjacent landowners should be encouraged through cooperative actions, effective communication, and through stewardship agreements with adjacent landowners.

7) Finally, the park's management plan should review options for natural heritage education and appreciation, especially with respect to mechanisms to service large numbers of visitors in an environmentally friendly fashion. Interpretive themes for the Rouge Valley Park could include themes such as Living with the Lake, Wild in the City, River Dynamics, Ecosystem Restoration, and others.

PREFACE

This survey is one of several reports on the significant natural heritage resources of the Rouge Valley Park, both ecological and geological. The ecological survey was initiated as a life science inventory of the Areas of Natural and Scientific Interest (ANSIs) located in the Rouge River valleys from Lake Ontario north to the forests near Finch Avenue. Following the announcement of the Rouge Valley Park by the Provincial Government in 1990, the Rouge Valley Park Advisory Committee requested that the survey be extended to the Phase 1 portion of the park as a whole (1820 ha), from Lake Ontario north to Steeles Avenue.

Special efforts have been made to address the historical evolution of the park's ecosystems and, especially, the ecological processes most influential in the modern park mosaic. This report is intended, as a result, as a resource document supportive of informed management planning of the Rouge Valley Park. (The northeastern corner of the park, now called Phase 2 (445 ha) is the subject of a separate survey designed to complement this study.)

The authors have built on a number of studies they have made of the lower Rouge River valleys since 1973. They hope these resource data are a useful benchmark for managing the natural legacy of the Rouge Valley Park in decades to come. The management recommendations of this study are intended to contribute to the public and agency discussions that will result in a Rouge Valley Park management plan.

The authors sincerely thank the many individuals who have shared their expertise, insights and observations of the Rouge River valleys, in particular, Bob Johnson, Paul Harpley, John Ambrose and Jim Fairchild of the Metro Toronto Zoo; Murray Speirs; Jim Robb; John Barker; Mike Cadman of the Ontario Rare Breeding Bird Program; Jack Cranmer-Byng; Luc Fazio; James Garrett; Martin Geleynse; Robert Jackson; Brian Henshaw; Gary Allen; Harold Kerr; Mark Stabb; Ian Kirkham; C.D.H. Clarke (deceased); Glen Hooper and Ian Buchanan of MNR Maple District; Peter de Groot and Sue Woodward of the Mammalogy Department of the Royal Ontario Museum; Paul Catling; Vince Moase; Beth Jefferson; John ten Bruggenkate; Robert Steedman; Tasha Stephenson; Sandy Connell; John Leonard; Phil Taylor; Reid Wilson and Peter Wigham of the Metropolitan Toronto and Region Conservation Authority; and Tim Dickinson and Deb Metsger of the Botany Department, Royal Ontario Museum. We would also like to thank the Pickering Naturalists and Toronto Field Naturalists for access to their files.

Joan Winearls (Map Library, University of Toronto), Caroline Gray and Jan Rollins (Ontario Archives), Ken Robinson (OMNR Photo Lab), and Dana Poulton assisted us greatly by directing us to historical documents, maps and airphotos of the study area. The authors gratefully acknowledge the company and contributions of numerous friends and associates who have accompanied them on fieldtrips through the Rouge River valleys. Finally, Marg McLean is particularly thanked for the cartographic work throughout the report.

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ECOLOGICAL SURVEY OF THE ROUGE VALLEY PARK

CHAPTER I: REGIONAL BACKGROUND

i) INTRODUCTION

The Rouge Valley Park study area, of about 2265 ha, stretches south from Steeles Avenue on Metro Toronto's northern border to Lake Ontario, including the Rouge River valley the Little Rouge Creek valley, and the intervening uplands (Fig. 1). This report documents the ecological surveys that have been undertaken in the park. It evaluates the environmental attributes and processes of the area, in support of informed management planning. The study area lies in the City of Scarborough (Regional Municipality of Metropolitan Toronto) and the Town of Pickering (Regional Municipality of Durham) (Fig. 2) and, for the most part, is publicly owned, by the Metropolitan Toronto and Region Conservation Authority and the Ontario Ministry of Government Services.

Collectively, the lower Rouge valleys, lakeshore marshes and adjacent tablelands form the most pristine and diverse system of linked natural areas along any of the lower river valleys draining into northwestern Lake Ontario. The Rouge Valley Park represents one of very few substantive corridors of natural open space extending from the northwestern shores of Lake Ontario towards the interior of Halton, Peel, York, Durham, or Metropolitan Toronto. In the context of this Greater Toronto Area, where development has significantly fragmented the native landscapes of the region, the lower Rouge valley represents a remarkable opportunity to conserve a provincially significant natural heritage resource in its natural state, in a near-urban park.

The Rouge River watershed rises on the Oak Ridges Moraine north of Toronto. This small watershed (337 square kilometres) crosses predominantly level, rural, agricultural landscapes until it nears the glacial Lake Iroquois shoreline, where it becomes a mature forested ravine complex for its final 11 kilometres (Fig. 2). Here, in the Rouge Valley Park, occurs a remarkable diversity of native ecosystems; mature upland forests of White Pine, White Cedar, Hemlock, Red Oak, White Oak, Red Maple, Sugar Maple and Beech - with many trees over a century old - as well as successional forests, Toronto's largest marsh, extensive wooded bottomland terraces, Great Lakes shoreline beaches, spectacular erosional bluffs, horsetail streamside meadows, old pastures and abandoned homesteads.

This wide spectrum of vegetation communities supports over one-quarter of Ontario's flora, a total of 762 plant species, of which five are nationally rare, one is provincially rare, and ninety-two are regionally rare. Fifty-five species of fish swim in its rocky streams, oxbow lakes and marsh channels. Another 123 species of breeding birds, 27 species of mammals, and 19 species of reptiles and amphibians reside in the park. Fifty-eight of the faunal species are considered locally rare or uncommon; nine of the bird species are nationally significant or species of concern; two fish species are nationally vulnerable.

The Rouge Valley has long been recognized as an important wilderness area by naturalists, by the public and by public agencies. Portions of the Rouge have been identified as provincially significant wetlands and areas of natural and scientific interest (ANSIs, Hanna 1984) by the Ministry of Natural Resources. It is one of 38 critical Carolinian Canada sites selected by the Natural Heritage League (Eagles and Beechey 1985). A number of environmentally significant areas (ESAs) have been identified by the City of Scarborough (City of Scarborough 1983), the Metropolitan Toronto and Region Conservation Authority (M.T.R.C.A. 1982), and the Toronto Field Naturalists (Riley 1980, Varga 1982).

ii) PHYSICAL BACKGROUND

Physiography, Geology and Soils

The diverse earth science features and the chronology of geological events in the park have been documented in detail by Eyles and Boyce (1991). The bedrock of the park is the Whitby Formation, consisting of shales 450 million years old, exposed in several areas along the Rouge and Little Rouge stream beds. These exposures include the type section of this formation. The bedrock is overlain by Quaternary ice age sediments up to 120,000 years old deposited by glaciers moving across the park. The most recent till, the Halton Till, covers most of the park.

Two-thirds of the park consists of gently undulating tablelands falling from a maximum elevation of 175 m a.s.l. at Steeles Avenue to 75 m a.s.l. at the Lake Ontario shore. The remainder of the park is occupied by stream beds, floodplains and slopes of the Rouge River and Little Rouge Creek valleys, which have eroded, in places, 40 m below the surrounding tablelands.

The tablelands in the park, north of Finch Avenue, are part of the Halton Till Plain (Chapman and Putnam 1984). This till is sand-rich with abundant limestone pebbles and granitic boulders. The major topographic features are nine drumlins, up to 30 meters high and 300 m to 1 km long, and a number of flutes, long linear ridges separated by shallow troughs, 2 to 5 meters high, up to 5 km long, and 200 m wide. These features trend in a northwest to southeast orientation, recording the last advance of grounded ice across the region about 13,000 years ago. Minor tributaries on the tablelands are typically orientated in a similar fashion, being confined to the troughs of the fluted terrain. At right angles to this trend are the occasional parallel series of low ridges which are presumed to be seasonal push ridges created along the glacial front. Small clay or sand filled depressions up to 2 m deep in the Halton Till also provide evidence of local ice-margined lakes, the Peel Ponds, which existed for a short period about 13,000 years ago. These small clay plains are found east of Little Rouge Creek around Steeles Avenue, around the CPR tracks and Reesor Road, the east side of the Rouge River south of Steeles Avenue, and south of the Rouge west of Sewells Road. A small sand plain occurs on a knoll in the Rouge River Finch meander.

The tablelands in the southern part of the park were flooded between 12,500 and 12,000 years ago by Lake Iroquois, an ice-dammed, ancestral Lake Ontario. Its water levels were up to 60 meters above present lake levels. The Lake Iroquois shoreline passes through the Metro Toronto Zoo and the Beare Road landfill. Most of the shoreline has been removed by aggregate extraction and covered by landfill. The shoreline consisted of shingle beaches, sandy embayments and a shore terrace cut into the Halton Till. Three embayments in the park are found around the Townline Swamp, the cattail marsh at the Finch Avenue and Reesor Road intersection, and the Beare Road woodlot, the latter of which is the park's largest embayment, extending for 1.8 km. A five meter high terrace survives between Little Rouge Creek and Beare Road, and a shoreline is also present on the west side of the Core Woods in the Metro Zoo.

South of the shore a Lake Iroquois beach extends for up to 2 km across the Metro Zoo, the interfluvial tableland south to the hydroline, around the Beare Road landfill, and south of the confluence of the Rouge River and Morningside Creek. The beach consists of coarse sands and gravels and bouldery lags up to 5 m deep over the Halton till. With the exception of the swamps south of the Beare Road landfill, these beach deposits have largely been extracted for aggregate in the 1950s. A locally recharged shallow aquifer discharges water along the base of these beach deposits, maintaining swamps on the tablelands south of the Beare Road landfill and, at one time, south of the intersection of Sheppard Avenue and Meadowvale Road. A small remnant of this latter swamp still exists in the Centennial Forest and Swamp ESA (City of Scarborough 1983).

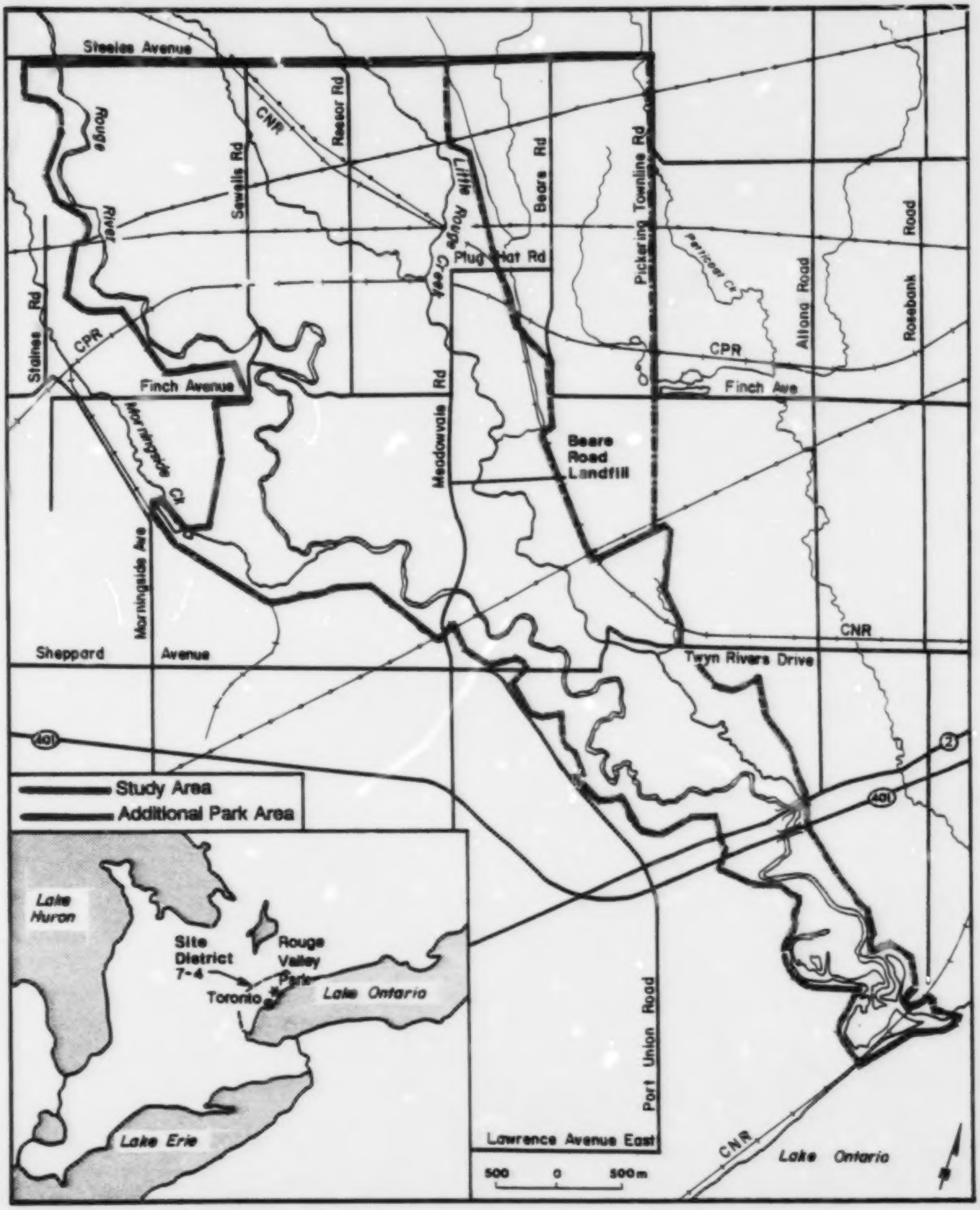

Steeles Avenue
Rouge River
CNR
Sewells Rd
Reesor Rd
Little Rouge Creek
Beare Rd
Pickering Townline Rd
Petticoat Ck
Altona Road
Rosebank Road
Plug Hat Rd
Staines Rd
CPR
CPR
Finch Avenue
Finch Ave
Morningside Ck
Meadowvale Rd
Beare Road Landfill
Morningside Ave
Sheppard Avenue
CNR
Twyn Rivers Drive
401
401
2
Study Area
Additional Park Area
Lake Huron
Site District 7-4
Rouge Valley Park
Toronto
Lake Ontario
Lake Erie
Port Union Road
Lawrence Avenue East
500
0
500 m
CNR
Lake Ontario

Figure 1. Rouge Valley Park study area.

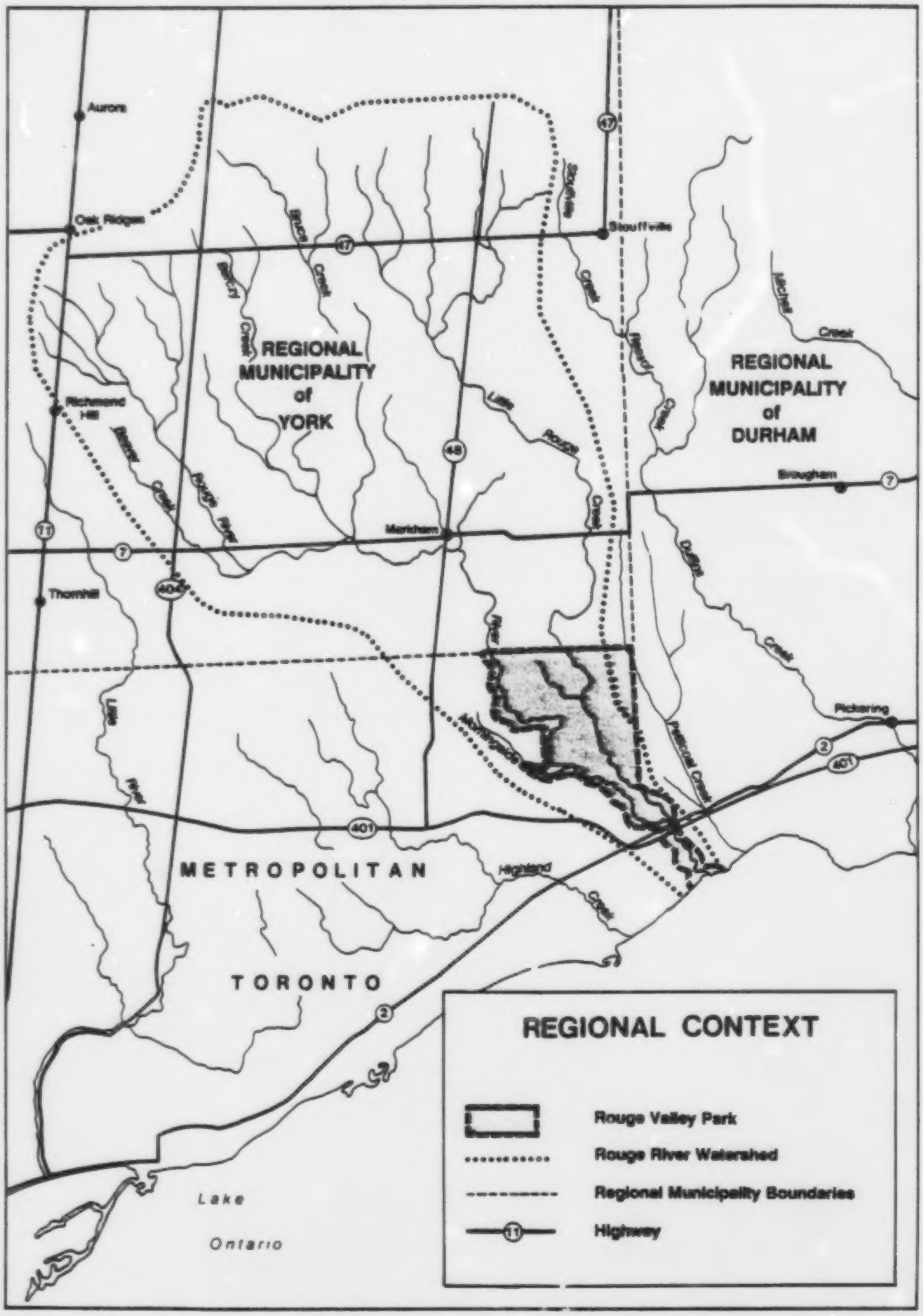

REGIONAL CONTEXT
Rouge Valley Park
Rouge River Watershed
Regional Municipality Boundaries
Highway
REGIONAL MUNICIPALITY of YORK
REGIONAL MUNICIPALITY of DURHAM
METROPOLITAN TORONTO
Lake Ontario
Aurora
Oak Ridges
Richmond Hill
Thornhill
Markham
Stouffville
Brougham
Pickering
Bruce Creek
Berczy Creek
Beaver Creek
Rouge River
Little Rouge Creek
Stouffville Creek
Reesor Creek
Mitchell Creek
Duffins Creek
Petticoat Creek
Morningside
Highland Creek
Little River
River
47
48
11
7
404
401
2

Figure 2. Regional context of the Rouge Valley Park, and the Rouge River watershed.

Further offshore, shallow depressions in the Halton Till were covered by thin veneers, up to 2 m deep, of littoral sand and, in deeper waters, silt and clay. Clay and silt plains are found on the tablelands west of the Rouge lakeshore marsh, and east of Little Rouge Creek north of Tywn Rivers Drive. Sand plains are found on the tablelands west of the Rouge River around Highway 401, southwest of Sheppard Avenue and the Rouge, on the interfluvial tableland south of the hydro-line, and at the northern edge of the Pinegrove swamp.

Soils on the tablelands consist primarily of calcareous to slightly acidic loams (Woburn and Milliken Soil Series) (Olding *et al.* 1990, Hoffman and Richards 1990). These soils occur on the Halton Till and have good to imperfect drainage. Less common soils on the Halton Till include the poorly drained calcareous loam (Lyons Soil Series) supporting tableland swamps between the Rouge River and Reesor Road. The Iroquois beach deposits have neutral to calcareous gravelly sandy loam soils (Brighton and Tecumseth Soil Series) and the pockets of Iroquois sand plain have slightly acidic to calcareous sandy loam soils (Brighton, Berrien, Bookton, and Granby Soil Series). Drainage in these soils vary from poor to good, with those of poor drainage supporting swamps such as the one south of the Beare Road landfill.

The Rouge River watershed occupies 337 square kilometres, and is up to 20 km wide north of the park. Its headwaters are found on the southern flanks of the Oak Ridges Moraine (Fig.2). The modern Rouge River and Little Rouge Creek valleys are about 13,000 years old (Eyles and Boyce 1991). They started as meltstreams during deglaciation, flowing into Lake Iroquois. By about 11,400 years ago water levels in ancestral Lake Ontario had declined to 100 to 120 meters below present levels, and the shore extended 3 km south of the present shore, where it was demarcated by a 30 meter high cliff about 8,500 years ago. As a result of the lowered lake, the rivers downcut greatly, leaving behind former floodplain terraces now 10 to 20 m above the modern floodplain. These series of relict terraces and raised meanders are best displayed around the Rouge River near Finch Avenue.

During the process of downcutting the rivers exposed the older Quaternary deposits below the Halton Till, especially along the valley walls north of Highway 401. Most common are exposures of the Scarborough Formation, and the Sunnybrook Till. The Thorncliffe Formation, York Till and the Don Beds are rarely exposed. These sediments consist of laminated silts and clays, and deltaic sands and silts. The permeable Scarborough and Thorncliffe Formations are important sources of aquifer discharge, evident as seeps and springs along the valley slopes. For example, springs along the Scarborough Formation are common in the Rouge River valley south of Twyn Rivers Drive and west of Meadowvale Road, where they maintain small cattail marshes, mixed swamps on relict terraces and White Cedar seepage slopes. Exposures of the Thorncliffe Formation on the west side of the Rouge River south of Steeles Avenue supply water to some of the park's largest seepage slope communities.

About 6,000 years ago, lake levels began to rise and continue to rise 0.23 meters per 100 years, flooding the lower 5 km of the valleys. The flooded valley is slowly being infilled with alluvial material building up a broad floodplain up to 500 m in width across the valley floor just north of Highway 401. South of Highway 401, the drowned river valley supports a large lakeshore marsh on peat and muck substrates, and a well developed sand spit at the rivermouth.

The bottomland sediments upstream of the confluence of the Rouge and Little Rouge consist of bouldery gravels in the riverbeds, especially along the sections between Twyn Rivers Drive and Finch Avenue where they consist of a reworking of the Iroquois beach deposits. The present floodplain consists of sands and bouldery gravels along old stream beds, and of more extensive fine alluvial sands and silts accumulated during flood events. These are interspersed with thin organic and rooted horizons. The abandoned terraces usually consist of 2 m of bouldery gravel and sand overlain by stratified silty sands.

Climate

The high diversity of the park's communities and species is partially attributable to a highly variable local climate, as well as to its highly diverse topography and substrates.

Brown *et al.* (1980) places the park in two climatic regions, the southern half in the Lake Ontario Shore Climatic Region and the northern half in the South Slope Climatic Region. The southern part of the park has a longer frost-free period, higher maximum January temperatures and slightly lower July maximum temperatures. This clearly demonstrates the moderating affect of Lake Ontario. For example, Auld *et al.* (1990) notes that the relatively deep and ice-free Lake Ontario has mid-winter near-shore surface temperatures slightly above freezing. By mid-summer the average water temperature reaches near 18°C. As a result, in contrast to inland sites, sites close to the lake have temperatures slightly cooler in summer (up to 25 km inland), and warmer in winter (restricted to 5 kms inland). As well, the slow cooling of the lake in the fall delays the onset of frost for lakeshore sites, effectively extending the frost free period.

A line of meteorological stations just west of the park gives more precise climatic data for the park. The data below show a decline in frost free period, and a drop in July and January temperatures away from the lake. For example the Northcliffe station on the lake (comparable to the Rouge River mouth) has a frost free period of 175 days, the Malvern Station just west of the Metro Toronto Zoo has a frost free period of 161 days, and the Markham station north of the park has only 129 days.

Station (period of record)	Distance from the lake (km)	Frost Free Period (days)	January C° Mean Maximum	January C° Mean Minimum	July C° Mean Maximum	July C° Mean Minimum
Northcliffe (1968-1980)	0.5	175	-1.9	-9.0	27.1	16.1
Beacon Road (1962-1975)	5	162	-2.2	-9.4	27.0	15.6
Malvern (1974-1980)	7.5	161	–	–	–	–
Agincourt (1950-1968)	8	153	-3.0	-10.9	26.3	15.3
Markham (1962-1980)	15	129	-3.0	-11.2	26.2	14.0

The climatic values for the southern part of the park are comparable to those encountered elsewhere in the northern portion of the Carolinian life zone, or site region 7. They are not far removed from Ontario's warmest climatic region, Pelee Island, which has a frost free period of about 180 days (Brown *et al.* 1980).

Topography also plays an important role in varying the local climate within the park. In the mid-summer of 1984, forest soil temperatures (a conservative measure of microclimate) were recorded in various parts of the park. The highest temperatures occurred on a southfacing valley slope 1.2 kms from Lake Ontario, and the lowest on a northfacing valley slope 6 kms away from the lake. Intermediate temperatures were recorded for westfacing slopes, the wide bottomlands of the lower Rouge River, and the tablelands.

iii) REGIONAL CONTEXT OF THE VEGETATION, FLORA AND FAUNA

The Rouge Valley Park occurs on the edge of one of the richest and most endangered ecosystems in Canada. Called the 'Carolinian life zone' (Soper 1956, 1962; Allen *et al.* 1990), or site region 7 (Hills 1959), this region is the most northerly example of North America's eastern deciduous forest region, which stretches from the Mississippi River to the Appalachians, and south to Tennessee. The northern limit of the deciduous forest region in Canada occurs as a broad tension zone stretching from Grand Bend on Lake Huron to London and terminating east of Toronto on Lake Ontario (Soper 1956, 1962; Maycock 1979).

This region supports a very high diversity of plants and animals, including about 2,200 plant species, nearly 400 species of birds, and 47 reptile and amphibian species (Reid 1985). Many of these species are southern, and are restricted in Canada to this region. For example, 40% of Ontario's 542 rare vascular plant species are restricted to the Carolinian life zone (Oldham 1990).

The most common trees in the Carolinian zone are the deciduous species: Sugar Maple, White Elm, Beech and Red Oak (Maycock 1963). The tree species which dominate an area are largely dependent on soil moisture and soil type. For example, Sugar Maple and Beech are most prevalent on moist upland sites; Red Oak, Black Oak and Shagbark Hickory dominate dry, excessively drained uplands; White Elm, White Ash, Red Maple and Silver Maple on wet lowlands; Black Willow, Peach-leaved Willow, Eastern Cottonwood and Silver Maple on lower bottomland terraces; and Manitoba Maple, White Elm, Red Elm, and Sycamore on higher bottomland terraces (Maycock 1963). Southern species in these forests, such as Black Walnut, Tulip-tree, Red Mulberry, American Chestnut, Black Gum and Sassafras, typically occur only as minor elements. Their frequency generally decreases, as well, with latitude, as sites cool towards the north.

Native non-forest habitats in the region support a large number of significant plants and animals, and add greatly to the diversity of the Carolinian life zone. They include marshes, bogs, fens, alvars, oak savannas, tall-grass prairies, Great Lakes shorelines, dunes, cliffs and talus slopes.

The Carolinian zone covers less than one-quarter of one percent of Canada's land mass, and is home to 25 percent of Canada's population. It is one of the most urbanized, industrialized and agriculturalized regions in Canada. This has had a profound affect on the region's natural values. Less than 10 percent of the region is now forested, 30 percent of this loss has occurred since 1958 (Price 1985). If this rate of loss continues, by early in the 21st century the remaining forests and wildlife will exist only in parks (Price 1985). Wetlands, prairies and oak savannas have also experienced large losses. The loss of habitats has resulted in the extinction or extirpation of a number of species. For example, historically this region supported Passenger Pigeon, Eastern Wapiti (an extinct subspecies of elk), Eastern Cougar, Marten, Fisher, Lynx, Bobcat, Wolf, Black Bear, and Atlantic Salmon (Lake Ontario type) (Banfield 1974, Scott and Crossman 1973, Peck and James 1983). Thirty-six plant species only known in Canada from the Carolinian Zone are presumed to be extirpated and another 140 plant species are known from less than six sites and may be considered endangered (Oldham 1990).

Being on the edge of the Carolinian zone, the Rouge Park also has elements of the adjacent deciduous-evergreen forest regions (Maycock 1979), also called the Great Lakes - St. Lawrence forest region (Rowe 1972) and site regions 4, 5 and 6 (Hills 1959). Colloquially called the mixed forest region, tree species such as White Pine, Eastern Hemlock, and Yellow Birch reach their optimums here. The Hemlock and White Pine forests in the Rouge Park, largely confined to cooler north facing valley slopes, are typical of this mixed forest region (Varga and Riley 1980). The frequent White Pine trees on the oak forested valley rims and on the interfluvial tableland south of Tywn Rivers Drive also gives a more northern appearance to the park.

The forest regions are described as site regions and districts (Hills 1959) or ecoclimatic regions (E.W.G. 1989) on the basis of major physiographic features. The Rouge Park occurs in site district 7-4 (Hanna 1984) which encompasses a gradually sloping plain on the north shore of Lake Ontario, bounded to the west by the Niagara Escarpment and to the north by the Oak Ridges Moraine. (This ecodistrict corresponds more or less to the

Greater Toronto bioregion (Crombie 1990). Politically, it includes the regional municipalities of Metropolitan Toronto, southern Peel and York, southwestern Durham, and southeastern Halton.)

The Greater Toronto area supports 20 percent of Canada's population, about 4 million people and, by the year 2011, it is projected to have a population of 5.4 million (Crombie 1990). Population pressures and the accompanying urban and industrial expansion have had profound effects on the area's natural values. Forest cover ranges from 0 to 10 percent in most areas (Hanna 1984), and an estimated 50 percent of its wetlands have been lost (Crombie 1990). Lakeshore marshes in particular have been hard hit, with a loss of about 90 percent of Metro Toronto's marshlands (Varga 1980).

The Rouge Valley Park's flora contains 56% of the native species known within site district 7-4, with one of its largest concentrations of regionally rare species. A number of these rarities are southern, or Carolinian plants at the limits of their range in the park.

With respect to its avifauna, the park contains significant breeding populations of bird species requiring relatively undisturbed woodlands of the transition zone between the Carolinian forests of the south and the mixed forests to the north. Also present are small breeding populations of Carolinian bird species at the northern limit of their ranges (e.g. Blue-gray Gnatcatcher) and of species most abundant on the Canadian Shield (e.g. Black-throated Blue Warbler). Additionally, the marsh at the mouth of the Rouge River continues to be an important nesting area for several provincially significant colonial and non-colonial wetland species, despite recent declines. The large expanses of mature woodlands and of successional forest and regenerating fields, make the Rouge Valley Park an important breeding area for all of the site district's more common avifauna, and for many species which are locally and even provincially uncommon or rare. The Rouge Valley Park is also significant within the region as a very important wintering ground and stop-over area for migrants.

Most of the fish, reptile, amphibian and mammal species known to reside in site district 7-4 can be found in the Rouge Valley Park.

CHAPTER II: ROUGE VALLEY PARK

i) HISTORIC LANDSCAPES

First Nations Vegetation 1300s-1700s

First Nations appear to have had considerable impact on the park landscape, especially during two periods of native corn agriculture in the 1300s to 1400s and in the late 1600s.

Mayer *et al.* (1989) document three Iroquoian villages dating from 1300 to 1400 on tablelands in the northern part of the park. The villages were, respectively, 0.4 ha, 1.0 ha and 2.4 ha in size, with the larger village possibly supporting 1000 to 1500 people (Poulton, pers. comm.). There is also evidence of half a dozen Iroquoian agricultural cabin sites ranging in size from 0.1 to 0.3 ha dating from 1300 to 1500 (Mayer *et al.* 1989). A considerable amount of tableland forest may have been cleared for croplands.

From about 1500 to 1665, there is no evidence of occupation in the park. It is thought that the Lake Ontario north shore was a no-man's-land reflecting the tribal conflicts of this period, and that the Iroquoians relocated north to Lake Simcoe and Georgian Bay (Mayer *et al.* 1989). Presumably, during this time, any clearings would have regenerated to forest.

From 1665 to 1687, the Senecas, and other Iroquoian tribes from what is now New York State settled on the north shore of Lake Ontario and built a large village of 2.5 ha in the park (Mayer *et al.* 1989). This was probably the village of Ganestiquiagon, referred to in Jesuit records and visited by Pere and Joliet in 1669.

It was located on a knoll near the confluence of the Little Rouge Creek and Rouge River, where the first rapids occurred. From here, a portage route led to Lake Simcoe and Georgian Bay, by way of the high ground (interfluvial tableland) between the two rivers. Croplands to feed the Seneca population, probably occurred on the uplands west of the village and, possibly, on the interfluvial tablelands. Around 1687, the Senecas relocated south of Lake Ontario again, and the cleared lands on the lower Rouge reverted to forest.

First Nations again colonized the park in the early 1700s. The Chippewa and Missisauga established several camps in or near the valleys, and their river names and old fields are noted on the first British surveys of the area (Fig. 3, 4).

European Presettlement Vegetation 1793-1833

The park's vegetation at the time of European settlement is recorded in the Ontario Land Surveys. Vegetation, soil type, steep slopes and streams are described in surveyors' field notes for: the lakeshore marsh and surroundings along the Pickering Range 1, 2 and 3 lines (Galbraith 1833a); the upper portion of the park along the 5th concession line in Scarborough (Galbraith 1833b); and for scattered lots originally reserved for the Crown and Clergy throughout the Scarborough portion of the park in Concessions 2, 3 and 4 (Jones 1795). A 1793 survey map of 230 acres of the park reserved for Governor John Simcoe was one of the products of the early surveys (Fig. 3).

The surveyors describe an almost continuous forest cover only occasionally broken by windfalls and open wetlands. On the valley floodplains, for example, Galbraith (1833a) noted a valley marsh just north of today's lakefront marsh on the 3rd range line:

> "A wet marsh partly a quagmire and partly deep water with Flags and Pond Lillys [sic] growing in it...next to the stream [Rouge River] the quagmire ends and some small swamp ash and alders grow along the edge of the stream."

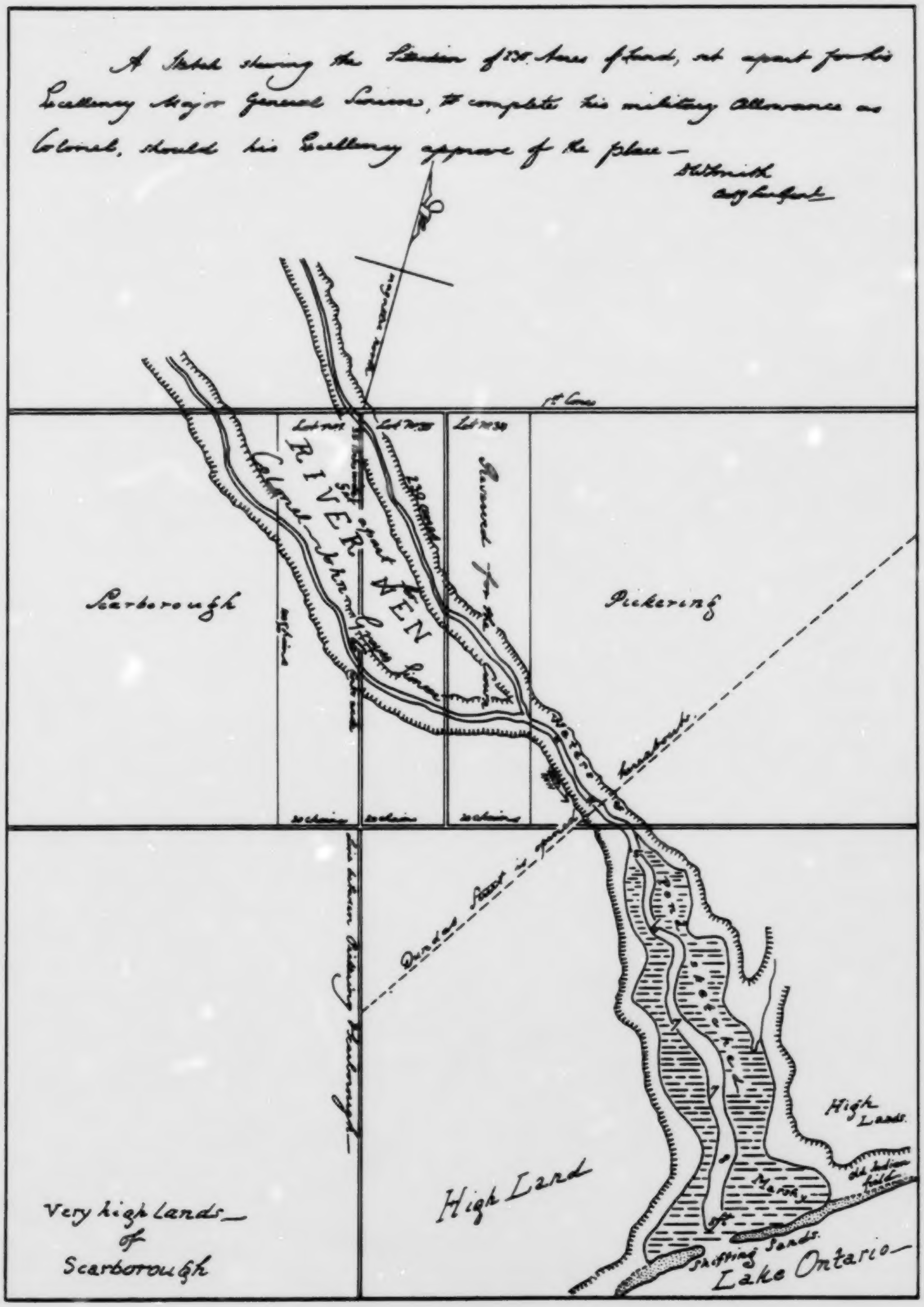

A Sketch showing the Situation of 230 Acres of Land, set apart for his Excellency Major General Simcoe, to complete his military Allowance as Colonel, should his Excellency approve of the place —
D.W.Smith
1st Con
RIVER NEN
Reserved for the Crown
Scarborough
Pickering
Waters
Dundas Street
Marsh
High Lands
High Land
Very high Lands — of Scarborough
Shifting Sands
Lake Ontario —

Figure 3. "A sketch showing the situation of 230 acres of land set apart for his Excellency Major General Simcoe, to complete his military allowance as Colonel, should his Excellency approve of the place" (D.W. Smith 1793).

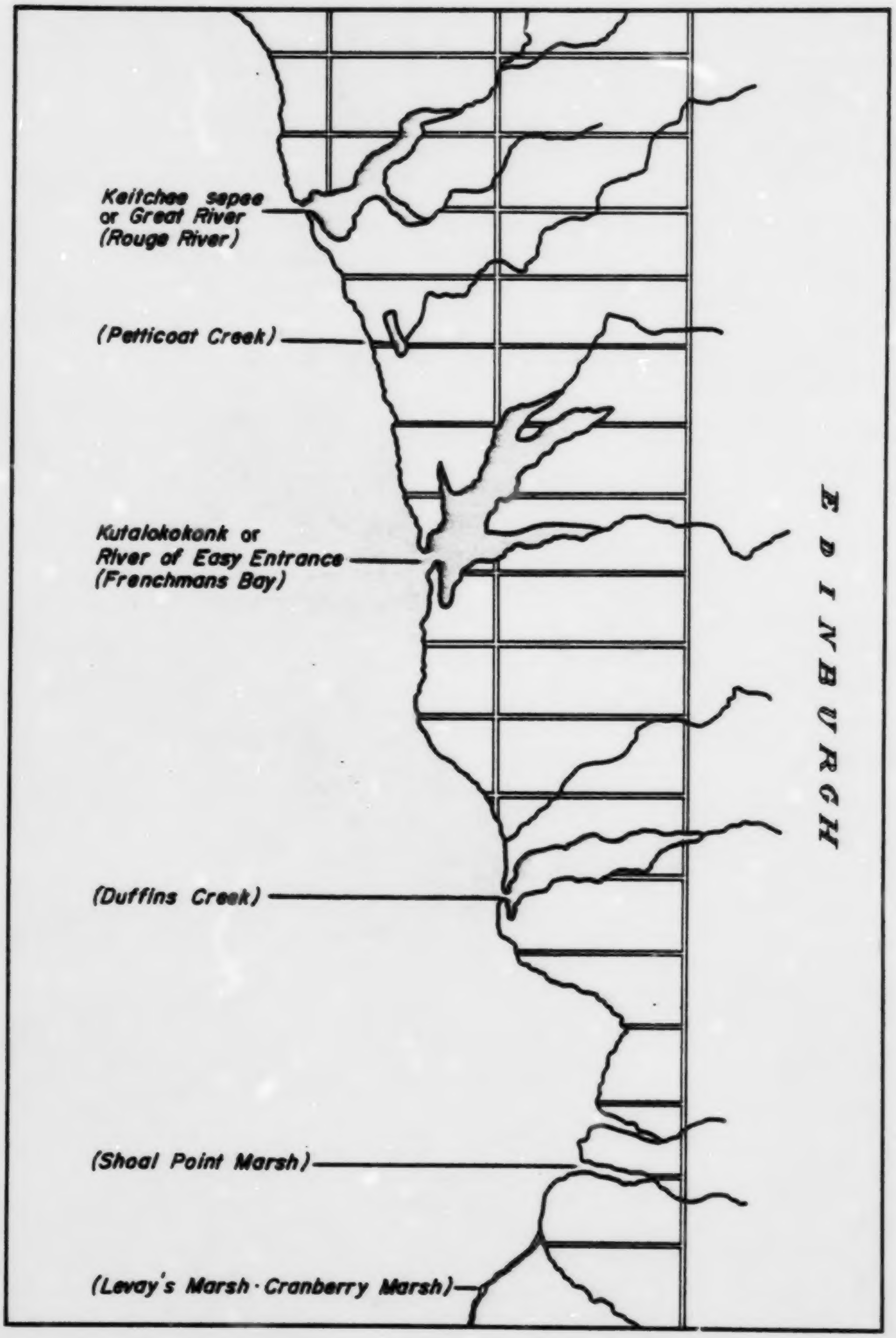

Keitchee sepee or Great River (Rouge River)
(Petticoat Creek)
Kutalokokonk or River of Easy Entrance (Frenchmans Bay)
(Duffins Creek)
(Shoal Point Marsh)
(Levay's Marsh · Cranberry Marsh)
EDINBURGH

Figure 4. "Pickering Home District Partial." (Copy of Augustus Jones Plan *ca.* 1797; bracketted names are modern equivalents).

Upstream, just south of Steeles Avenue, Galbraith (1833b) described a mixed forest of White Elm, Black Ash, maple, White Cedar and Basswood on the Rouge River bottomlands; a mixed forest of Hemlock, White Cedar, maple and Basswood in the Little Rouge Creek bottomlands; a deciduous bottomland forest of maple, Basswood, White Elm along a tributary of Little Rouge Creek; a deciduous swamp of Black Ash and White Elm near the headwaters of a tributary of Petticoat Creek; and a White Cedar conifer swamp along Morningside Creek. Examples of these forest types still occur on some of the higher bottomland terraces in the park. Most of the lower terraces, however, are now dominated by recent forests of Manitoba Maple and introduced willows.

The valley slopes also supported forests in pre-settlement times similar to those today. On moist, northfacing slopes, Galbraith (1833a,b) noted mixed forests of Hemlock, maple, White Pine and Basswood. Moist slopes of various aspects supported maple and Beech forests. Drier, southfacing slopes had forests of White Pine, oak and Beech. In one description, Galbraith (1833a) noted that a dry slope, east of the river and south of Highway 401, supported vegetation essentially the same as today:

> "scattering trees of pine [White Pine] and oak with an almost impenetrable thicket of briars, hazel and other sorts of brush."

On the tablelands, the forests varied with soil condition. The composition of tableland forests are summarized in Table 1, for survey lines along the 5th Concession in Scarborough, along Pickering Range 3, and to the south along the Pickering/Scarborough Township boundary. Moist uplands with clay or loamy soils supported deciduous forests of Sugar Maple, Beech, Basswood and White Elm; and mixed forests of Hemlock and hardwoods, and White Pine, Hemlock and hardwoods. Scattered through the deciduous stands were large White Pines with crowns above the deciduous canopy. On sandy or dry knolls, forests of Red Oak, White Oak and White Pine were abundant. Coarser sands west of the park between Highland Creek and Victoria Park Avenue back from the Scarborough Bluffs supported "pine barrens" or "pine plains".

John Goldie, the Scottish-Canadian botanist, described these oak-pine forests of the park and the nearby pine barrens in his diary from June 25, 1819, while travelling Dundas Street (Fig. 3) into Toronto:

> "As I did not intend to go into York [Toronto] tonight, I travelled the day but slowly, sometimes in woods and sometimes in cleared land. Before mid-day I passed a creek [the Rouge] which lay very low, so that the road is very steep on each side. All the declivity on the east side was completely covered with *Penstemon pubescens* [*P. hirsutus*, Hairy Beardtongue], such a quantity of which I never expected to see in one place. For a number of miles today I passed through barren sandy pine woods which it is probable will never be cleared" (Goldie 1819).

The abundance of Hairy Beardtongue, a species of relatively open ground, and the large expanse of pine barrens west of the park, suggests that fire, particularly ground fires, played a role in the ecology of these drier forests. Fire scars are apparent in tree cores taken from oaks and White Pines on the east side of the Rouge Valley south of Highway 401, near the route taken by Goldie. There is a historical reference to a fire along this side of the valley in 1802 (R.D.H.P. 1956). Evidence of a fire also appears in Galbraith's (1833a) description of forests along the 3rd Range line. On the tablelands, up to 260 m west and 550 m east of the Rouge Valley, and on the valley slopes, he described scattered trees with a dense thicket of "briars", "hazel" and "brush". Such conditions normally occur on burned sites several decades after a fire.

Table 1. Pre-settlement composition of the tableland forests of the Rouge River watershed south of Steeles Avenue, based on vegetation descriptions in the Ontario Land Surveys (Galbraith 1833 a,b).

Mid-Rouge Transect

Forest Type	Percentage of Transect
Hardwood Deciduous Forest (maple, Beech, Basswood, White Elm)	40
Hardwood - Hemlock - White Pine Mixed Forest	2
Hardwood - White Pine Mixed Forest	19
White Pine - Hardwood Mixed/Conifer Forest	24
White Pine - Hemlock - Hardwood Mixed/Conifer Forest	16

- White Pine dominates 40% of tableland forests and is a secondary species in 19%.
- Hardwood (largely maple and to a lesser extent Beech) dominates 40% of tableland forests, is a co-dominant in 19% and a secondary species in 24%.
- Hemlock is a secondary species in 19% of tableland forests.

Lower Rouge Transects

Forest Type	Percentage of Transect
Hardwood Deciduous Forest (maple, Beech, Basswood)	36
Hardwood - White Pine Mixed Forest	12
Hemlock - Hardwood Mixed Forest	8
White Pine - Hardwood Mixed Forest	16
White Pine - Hardwood Mixed Forest/Savannah with a dense shrub layer (possible post-fire forest)	11
White Pine - Oak - Hardwood Mixed Forest/Savannah with a dense shrub layer (possible post-fire forest)	9
Hemlock Conifer Forest	3

- White Pine dominates 36% of tableland forests and is a secondary species in 12%.
- Hardwood (largely maple and to a lesser extent Beech) dominates 36% of tableland forests, is a co-dominant in 20% and a secondary species in 27%.
- Hemlock dominates 9% of tableland forests and is a co-dominant in 8%.
- Oak dominates 9% of tableland forests.

(Summary based on survey lines along the 5th Concession, Lots 2 to 17 in Scarborough (Mid-Rouge transect); and along Pickering Range 3, Lots 29 to 35 and south to Lake Ontario along the Pickering/Scarborough Township boundary (Lower Rouge transects, south of Hwy. 401). For these two transects, vegetation descriptions were grouped in forest types, and expressed as the percent of the transect line occupied by each forest type.)

European Settlement Vegetation 1800-1914

The first European settlers arrived in the Rouge Valley Park study area in 1799, with the opening of Dundas Street. Initially farms consisted only of a hectare or so of cleared land in otherwise continuous tracts of forest (R.D.H.P. 1956). As late as 1851, 73% of Scarborough Township was still forested (R.D.H.P. 1956). In 1863, it was taken for granted that a settler would clear only about two-thirds of the land he took up, and Scarborough and Pickering Townships retained about 33% of its forests intact (R.D.H.P. 1956).

In the following 30 years, however, agricultural competition and low crop prices created economic hardship, and also forced farmers to sell their woodlots for cordwood and sawlogs (R.D.H.P. 1956). The majority of farmers fully cleared their land, leaving only 8% forest cover in Scarborough and Pickering Townships.

The park's rich bottomlands were cleared for pasture or cultivation. To ensure a dependable supply of water power for grist mills and sawmills, the rivers were dammed up to create mill ponds. In some cases, water was diverted from the river. For example, water was diverted for 1 km from the Rouge River south of Twyn Rivers Drive into two dammed ponds. At Sewells Road and Old Finch Avenue, water was diverted across a narrow area above and below the Finch meanders, filling a mill pond to power a sawmill (Fig. 5,6,7).

Sawmills and gristmills began to appear in the park's bottomlands in the 1840s. By 1850 Wheelock's map of Scarborough Township (Fig. 5) showed 14 mills in the park, including 6 on the Little Rouge Creek, 7 on the Rouge River and one on Morningside Creek. By 1860, the number of mills had declined to 7, with one still remaining on Morningside, 2 on the Little Rouge and 4 on the Rouge, including a new mill (Fig. 6). Numbers declined further to 3 mills in 1878, with one on the Little Rouge and 2 on the Rouge, including a new mill (Fig. 7). The latter 2 mills continued to show up on topographic maps until 1930, and the mill pond for the sawmill at Finch Avenue and Sewells Road was in place until the 1940s.

The forests of the Rouge were first high-graded for the large oaks and White Pine used in the square timber trade; this was the era of great wooden sailing ships. The supply of local squared timber was abundant in 1817, peaked in 1825, and was largely exhausted by 1850. In the park, a 'mast road' ran down the ridge between the Little Rouge Creek and the Rouge River, reaching the Rouge near the confluence of the two rivers (R.D.H.P. 1956). The squared timbers were carried down the mast road and then floated to the river mouth and shipped overseas.

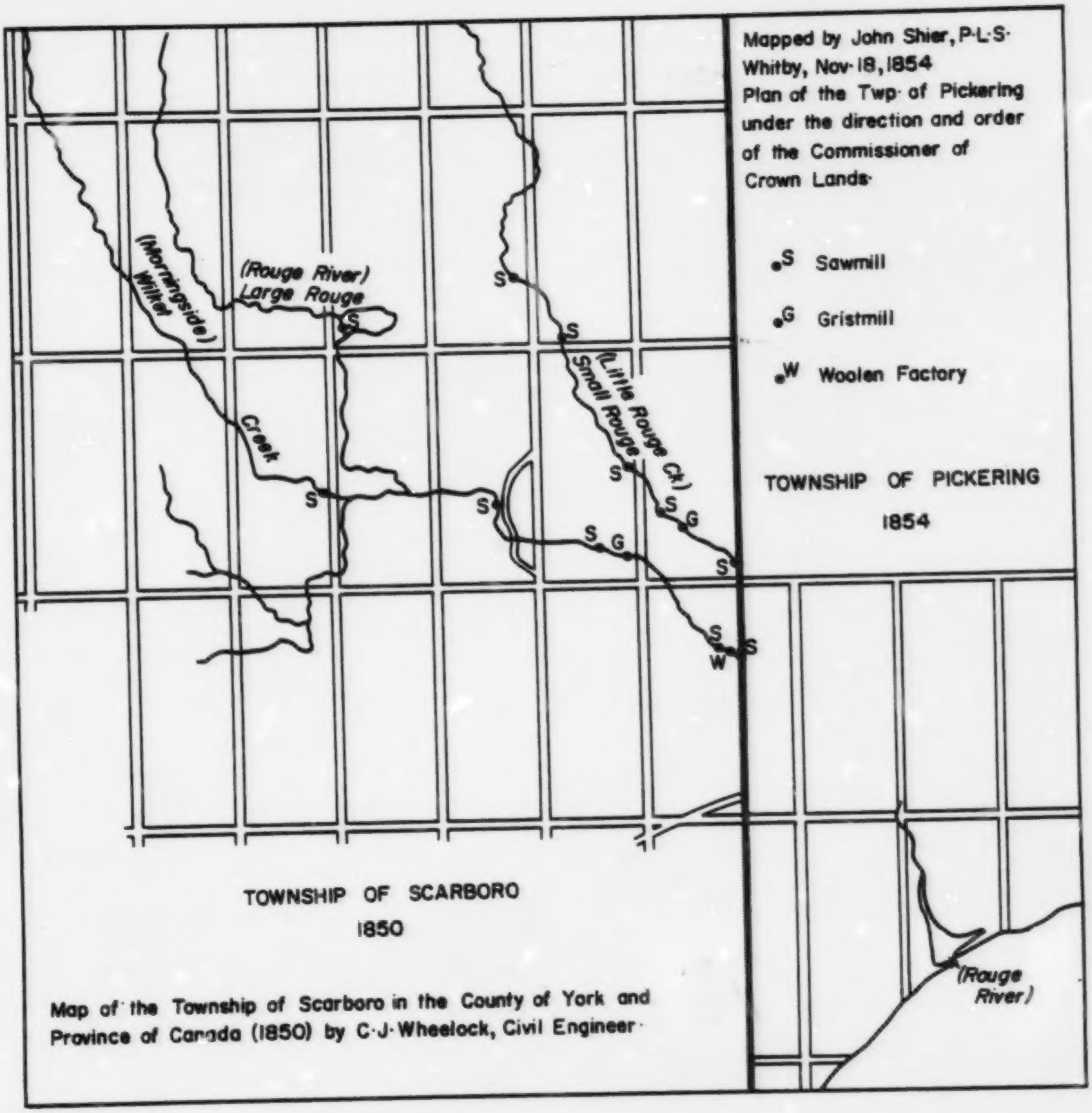
By the 1850s smaller diameter trees from the valley slopes and the adjacent uplands, still largely wooded, were cut for cord wood and for sawlogs for the various sawmills operating on the rivers.

Although the bottomlands and adjacent tablelands were cleared for agriculture, the steep valley slopes and the tablelands between the two rivers south of Twyn Rivers Drive remained in woodland through the 19th century, albeit probably as young second growth forest during the late 1800s.

Today, most of the mature trees of the park's forests date from the intense period of logging in the early to middle 1800s. Tree cores taken from mature oak-pine and pine-hemlock forests show that the oldest White Pines were established in the early 1860s, and the oldest oaks date back to 1837. Counting White Pine tree rings on stumps left from a 1960s cutting on the interfluvial tablelands south of Twyn Rivers Drive also indicate their origins in the 1830s.

The pattern of forest clearing from 1851 to 1954 is indicated in the following percentages of remaining native woodland in Scarborough and Pickering (R.D.H.P. 1956):

	1851	1861	1891	1911	1921	1931	1941	1951	1954
Scarborough	73.2	33.6	8.3	7.2	6.5	6.7	4.2	7.5	9.6
Pickering	45.0	32.9	8.4	3.9	6.1	6.0	6.6	7.3	9.7



Mapped by John Shier, P.L.S. Whitby, Nov. 18, 1854 Plan of the Twp. of Pickering under the direction and order of the Commissioner of Crown Lands.

Map of the Township of Scarboro in the County of York and Province of Canada (1850) by C.J. Wheelock, Civil Engineer.

S Sawmill
G Gristmill
W Woolen Factory
TOWNSHIP OF PICKERING
1854
TOWNSHIP OF SCARBORO
1850
(Morningside) Wilket
Creek
(Rouge River) Large Rouge
(Little Rouge Ck.) Small Rouge
(Rouge River)
S
G
W

Figure 5. Rouge Valley Park, 1850-1854 (sources as indicated).

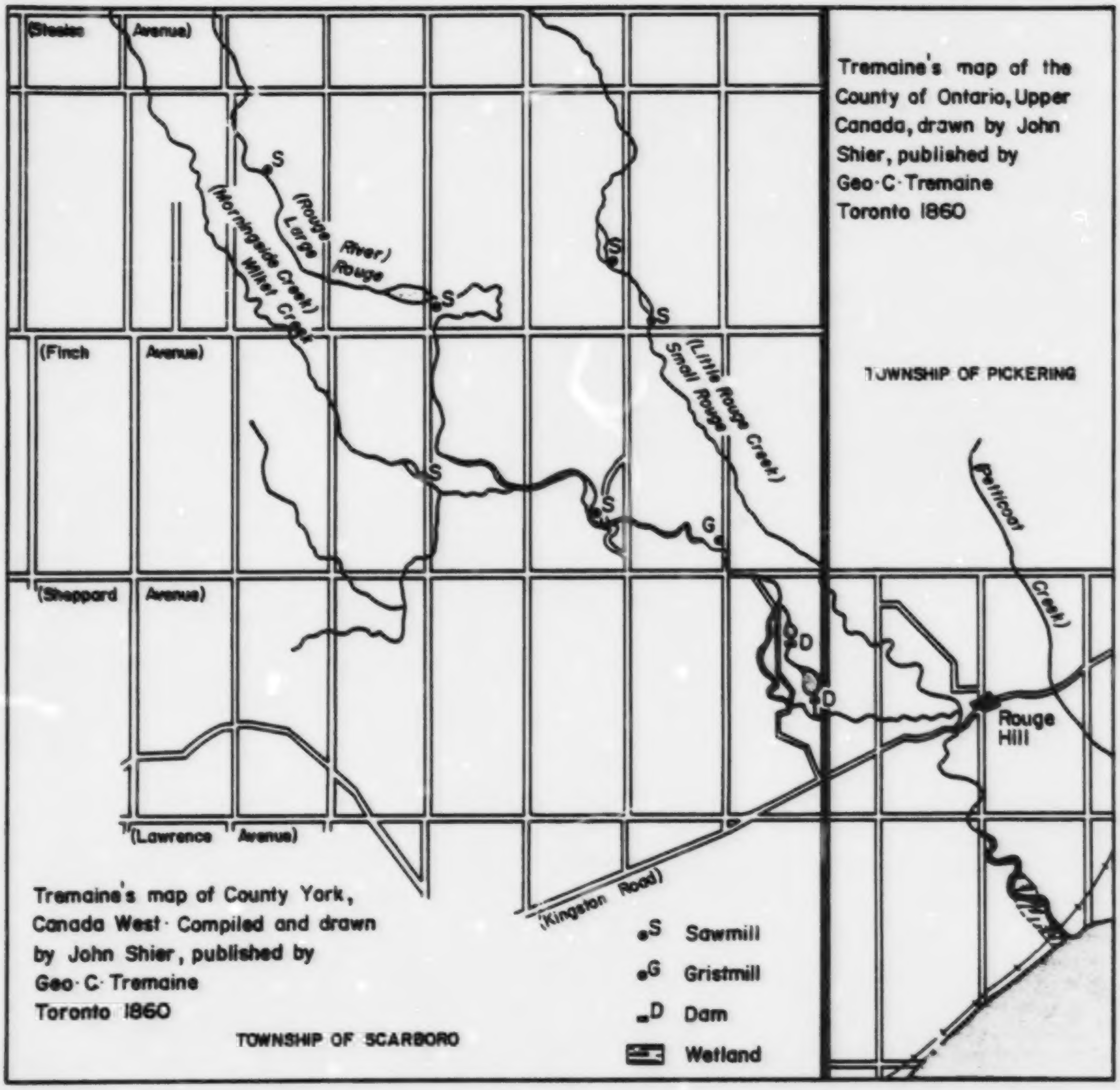
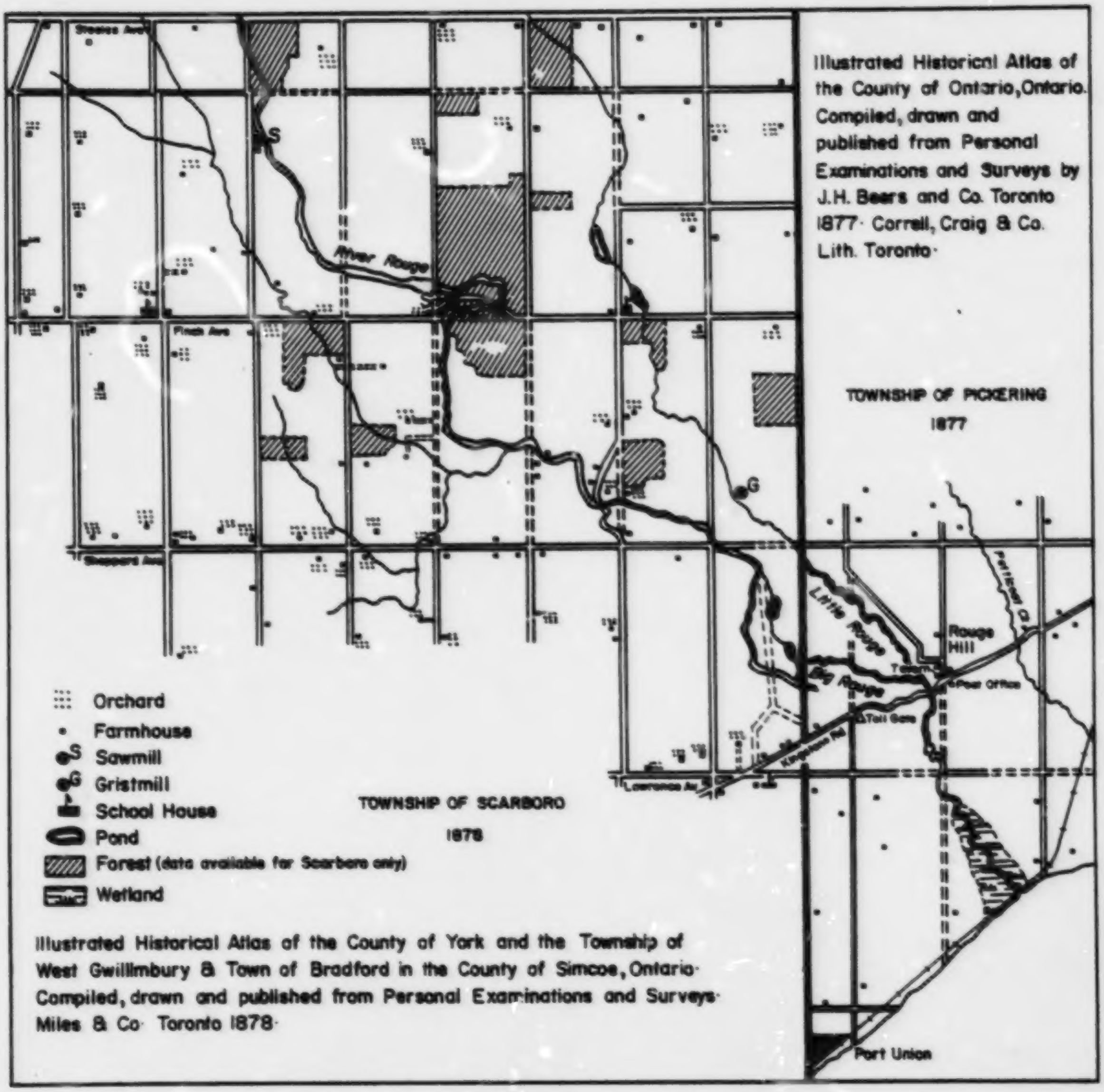

(Steeles Avenue)
Tremaine's map of the County of Ontario, Upper Canada, drawn by John Shier, published by Geo·C·Tremaine Toronto 1860
S
(Rouge River)
Large Rouge
(Morningside Creek)
Wilket Creek
S
S
S
(Finch Avenue)
TOWNSHIP OF PICKERING
(Little Rouge Creek)
Small Rouge
(Petticoat Creek)
S
S
G
(Sheppard Avenue)
D
D
Rouge Hill
(Lawrence Avenue)
(Kingston Road)
Tremaine's map of County York, Canada West · Compiled and drawn by John Shier, published by Geo·C·Tremaine Toronto 1860
TOWNSHIP OF SCARBORO
S Sawmill
G Gristmill
D Dam
Wetland

Figure 6. Rouge Valley Park, 1860 (sources as indicated).


Steeles Ave
S
River Rouge
Finch Ave
Sheppard Ave
G
Little Rouge
Petticoat Cr
Rouge Hill
Tavern
Big Rouge
Post Office
Toll Gate
Kingston Rd
Lawrence Av
Port Union
TOWNSHIP OF PICKERING
1877
TOWNSHIP OF SCARBORO
1878
⁝⁝ Orchard
• Farmhouse
●S Sawmill
●G Gristmill
School House
Pond
▨ Forest (data available for Scarboro only)
Wetland

Illustrated Historical Atlas of the County of Ontario, Ontario. Compiled, drawn and published from Personal Examinations and Surveys by J.H. Beers and Co. Toronto 1877. Correll, Craig & Co. Lith. Toronto.

Illustrated Historical Atlas of the County of York and the Township of West Gwillimbury & Town of Bradford in the County of Simcoe, Ontario. Compiled, drawn and published from Personal Examinations and Surveys. Miles & Co. Toronto 1878.

Figure 7. Rouge Valley Park, 1877-1878 (sources as indicated).

Modern Vegetation 1914 to 1990

Landscape changes in the park between 1914 and 1990 are recorded in detail, in the topographic maps of 1914, 1927 and 1930; in the aerial photographs from *ca.* 1920 for Rosebank Station, from 1931 south of Highway 401, and from 1939 to the present for all of the park; and in numerous other photographic records. These changes have been summarized as a map (Map 1).

Development activities in the park have been diverse, intrusive and persistent in the modern period, but the present park landscape also illustrates the resiliency of natural ecosystems and the progressive re-naturalization of many of its lands over the last 35 years, during which time public ownership and environmental sensitivity has increased.

A number of specific land use activities have resulted in major impacts and changes to the natural vegetation of the lower Rouge valleys, including: aggregate extraction, urban development, recreational development, service and transportation corridors, agriculture, and water control structures. On the other hand, the natural processes of ecological change have led to the natural regeneration of many of the park's forests, and to a dynamic equilibrium of the lakeshore and the lakeshore marshes with the changing water levels of Lake Ontario. (These latter processes are discussed in detail in Chapter II.vi.)

Aggregate Extraction

Extensive gravel and sand bars occurred in the river valleys in the vicinity of the former shoreline of glacial Lake Iroquois. These provided an easily accessible source of building materials for the city of Toronto and its suburbs. Pits appeared in the 1920s southwest of the park, in the extensive upland gravel bars between the Rouge River and Highland Creek. The first gravel pits in the park opened in 1940 on the current Beare Road landfill site. It soon became the largest pit in the park. There was also a small borrow pit from 1939 to 1941 on the west side of the Rouge River, just south of Highway 401. Materials from this pit were used during highway construction.

Gravel extraction peaked in the late 1950s. In addition to the Beare Road pit, there were large pits on either side of present day Meadowvale Road (Metro Toronto Zoo), on Reesor Road just south of Steeles Avenue, and surrounding the intersection of the Pickering Town Line Road and Finch Avenue. When these tableland pits had been exhausted by the late 1950s and 1960s, over 87 ha of surficial landforms in the park had been effectively removed. For the most part these consisted of agricultural lands, but 8.8 ha of forests and thickets were cleared at the Beare Road pit operation. In addition, 5 ha of forest abutting the park south of the Metro Toronto Zoo were also removed.

More significantly, gravel extraction was not restricted to the tablelands. From 1956 to 1960, 44.8 ha of the river bottomlands were subject to gravel extraction, including the actual river beds. This occurred along 3 km of the Rouge River, south of Finch Avenue and west of Sewells Road, and along 3.4 km of the Little Rouge Creek, from Twyn Rivers Drive north to Plug Hat Road. Gouge marks, spoil mounds and pits still remain from those riverside operations.

About 3.4 ha of bottomland forest was lost, the remainder consisting largely of old fields. The bottomland sites which were extracted down to the water table have since succeeded into Variegated Horsetail meadows which support such regionally significant species as the Slender Gerardia, Fringed Gentian, Closed Gentian and Shining Ladies'-tresses.

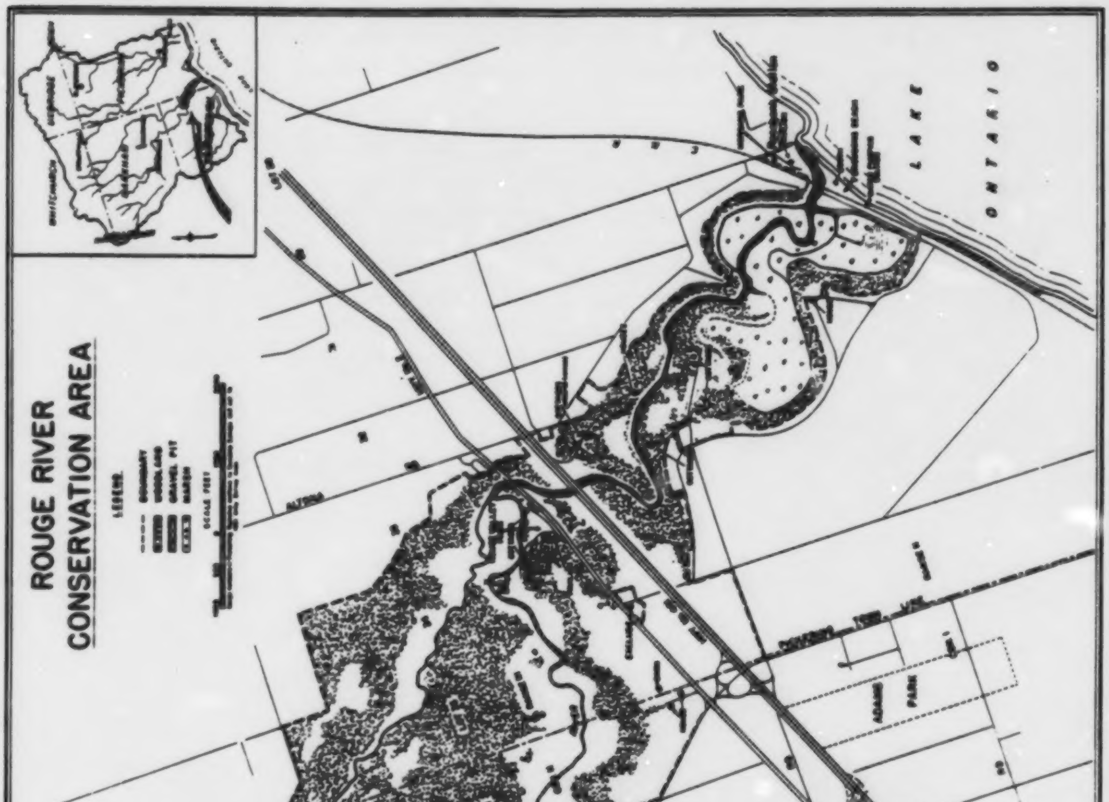

ROUGE RIVER
CONSERVATION AREA
LEGEND
LAKE ONTARIO
CENTENNIAL
MEADOWVALE

Figure 8. Southern portion of Rouge Valley Park, 1956. Note the extent of forest cover and clearings. (R.D.H.P. 1956).

Housing, Commercial and Industrial Development

In 1914, the lands making up the park were rural. The only villages were Rouge Hill on the east side of the Rouge River along Highway 2, and the resort community of Rosebank Station, also on the east side near Lake Ontario.

South of Highway 2, homes were built in the 1920s on the uplands east and west of the Rouge valley, with an increase in housing starts after World War 2. In the valley itself, from the 1920s to 1940s, 12 cottages were built along the lakeshore, 30 on the bottomlands (Fig. 8), and 2 on an upland knoll.

There was a development plan to build "Venice of the North" in the northernmost lakeshore marsh. A triangular network of canals was dug and an access road was built, but the project did not survive the Great Depression (Wainio et al. 1973). In 1957, construction began on the first major subdivision on the Scarborough side. A dramatic increase in development occurred in the 1980s with major subdivisions on both sides of the park.

The area **between Highway 2 and the hydro-line north of Sheppard Avenue** remained rural until the 1940s, with the exception of the village of Rouge Hill. After World War 2, scattered housing lots were built on uplands to either side of the park. The first major subdivision was built along Meadowvale Road between 1976 and 1981. Numerous subdivisions were built from 1984 to the present on both the Scarborough and Pickering sides. In the valley, several farms on the bottomlands maintained orchards and extensive pastures until the 1940s. At this time, about 6 homes were built along Twyn Rivers Drive and 12 cottages were constructed north of Highway 2, at the present site of the Glen Rouge Campground.

North of Sheppard Avenue and the hydro-line, the park and its environs were rural until the 1970s. A few homes were built on the uplands in the 1950s and 1960s along Plug Hat Road and the northwest corner of Reesor Road and Old Finch Avenue. In the valley, there were a few homes along Old Kirkham Road and six at the Finch Meander.

The largest concentration of valley homes in this area was at Woodland Park on Little Rouge Creek just below Steeles Avenue. Fifty cottages were constructed on wooded bottomlands in the 1940s and 1950s. In 1979, Malvern Development, west of Morningside Avenue, became the first major subdivision in the area. During the 1980s major subdivisions were completed right up to the park boundary around Finch Avenue and Morningside Creek. In addition, a large industrial park was constructed along the northeast corner of Sheppard and Morningside Avenues.

Within the valleys, most of the cottages, homes and farms were removed by the 1960s or 1970s, as lands were acquired by the Metropolitan Toronto and Region Conservation Authority following Hurricane Hazel in 1954. These lands are largely succeeding towards a more natural vegetated condition, through deliberate passive management of the areas.

In contrast, the expansion of housing on the surrounding uplands has reduced the size of the remaining natural areas. For example, 18 ha of upland forests which were contiguous with the forests of the Rouge valleys have been converted to housing, much of it in the area east of Little Rouge Creek and south of Twyn Rivers Drive.

Another 34.6 ha of forest within 500 m of the present park boundary have also been converted to housing, including a mixed upland forest just east of the Rouge marshes, a White Cedar woodlot on Morningside Creek near Old Finch Avenue, and 17.5 ha of the Centennial Forest and Swamp ESA (Fig. 34). In some cases the loss of these nearby natural areas may have diminished the biological diversity of the Rouge park, such as through the loss of amphibian breeding ponds in the Centennial Forest and Swamp ESA (Johnson, pers. comm.).

In addition, storm sewers and water control structures installed to deal with stormwater runoff from various developments have created further losses to natural areas, affected stream quality and sediment loads, and intensified erosion and deposition along the rivers.

Water Control Structures

Various water control structures have been built in the park area to control stormwater runoff, especially near areas being urbanized. On Morningside Creek, 3.3 ha of forests were lost in 1974 and 1985 when 2 energy dissipators were installed, 500 m of the creek were straightened, and another section was stabilized with rock gabions.

In 1983 and 1987 two sedimentation and stormwater retention ponds were installed in the Rouge River west of Sewells Road to handle stormwater runoff from adjacent housing developments. This replaced 0.2 ha of marsh, 0.4 ha of forest and 2.4 ha of thickets and old fields. In 1988, a small tributary of the Little Rouge Creek south of Twyn Rivers Drive was rip-rapped for 200 m to facilitate stormwater runoff from a nearby subdivision.

Three sections of the Rouge River have been realigned to prevent damage to manmade structures. In the 1930s, the river was realigned to stop undercutting of Finch Avenue, and in 1972 the Rouge was rerouted to protect a monorail bridge at the Metro Zoo. In 1987, a section of the Rouge west of Sewells Road was realigned to protect a sedimentation detention pond and the road access to the pond.

Service and Transportation Corridors

The park area is criss-crossed by hydro lines, railway lines, gas and oil pipelines and highways, most of them running east-west across the valleys.

In 1914, the only major service and transportation corridors were Kingston Road (Highway 2; along the historic Dundas Street), and the Canadian Pacific and Canadian National (1856 'Grand Trunk') rail lines.

Between 1939 and 1942, Highway 401 was built across the Rouge valley. It was widened in 1971. Over 15 ha of forest were removed for this purpose, and the important linkage between the Rouge marshes and the rest of the valley was significantly weakened. In addition, salt and other contaminants from the Highway 401 and 2 corridors are runoff directly into the valley.

A further 6.8 ha of forest was lost in the construction of Meadowvale Road across the Rouge River in 1973 and 1974, and of Beare Road across the Little Rouge Creek in 1967.

The first hydro corridor across the park was constructed north of Sheppard Avenue in the 1920s. Its two lines were expanded to five from the 1930s to 1950s. Located across the central valleys of the Rouge River and Little Rouge Creek, it resulted in the clearing of 21.9 ha of forest. A second hydro corridor north of Finch Avenue, and another branching from it, was constructed in the 1940s. Two additional lines were added in 1956, 1969, and a branch line from the northwest was added in the 1980s. A further 7.7 ha of forest was cleared along these corridors, including the southern portion of the Reesor Woodlot.

Additional rail lines were added in the 1920s, a spur line to the gravel pits on Sheppard Avenue; in the 1930s, a parallel new line to replace the old CPR line; and in 1963, a second CNR line. The latter line resulted in the loss of 7.2 ha of forest, mostly from the Reesor Woodlot and the Beare Road Woodlot.

Pipelines cutting through the Little Rouge Creek and a small tableland woodlot east of the creek resulted in the loss of 1.4 ha of forest. Other service corridors, including sanitary sewer lines, also cross the valley.

Recreational Developments

In the 1920s and 1930s, recreational development focused on the lakeshore near the existing summer resort and train stop at Rosebank Station. Morgans Park on the east side of the Rouge rivermouth supported a large boathouse and, later a picnic pavilion on the adjacent uplands. A second boathouse existed in the 1930s at the end of Lawrence Avenue.

In the 1950s there were 4 commercial focal points for recreation. The first was Fergusons Beach on the lakeshore west of the Rouge rivermouth. A section of marsh was filled in to make way for 2 boathouses, and shoreline meadows were replaced by a parking lot, boat rentals, picnic grounds and refreshment stands to service visitors coming to the beach.

The second recreational centre was Rouge Valley Park, along Highway 2. This commercial park had a swimming pond on the river, picnic grounds, pavilions and refreshment stands.

The Rouge Valley Inn on Twyn Rivers Drive at the Little Rouge Creek supported an inn, picnic grounds, amusement area and a swimming pond on a dammed portion of the river.

Further up the Little Rouge Creek at Steeles Avenue, thousands came every summer weekend to Woodland Park. There were cottages, picnic grounds, refreshment stands, playing fields and a large swimming pond with a removable dam on the river. Four hectares of forest were cleared for these recreational facilities.

In the 1960s, swimming pools were added to Fergusons Beach and the Rouge Valley Park, owned by that time by the M.T.R.C.A.. The Caper Valley ski hill was constructed, and abandoned in the late 1970s. The Cedarbrae Golfcourse was expanded into the Rouge River Valley. Forest clearing for the ski hill removed 1.7 ha of mature hemlock forest, while the golf course expansion eliminated 6.1 ha of bottomland forests and 2.5 ha of bottomland swamp, once the largest White Cedar-Hemlock seepage swamp in the park area.

The 1970s were highlighted by the installation of the Metro Toronto Zoo. Most of the zoo was constructed on orchards and abandoned gravel pits. However, 9.4 ha of forest and thicket were lost to make way for pavilions, walkways and the zoo monorail. Twenty-one ha of forests and fields in the Rouge valley were also fenced for use as animal enclosures.

Today, recreational facilities in the park consist of the Metro Toronto Zoo, the campgrounds at Woodland Park and Glen Rouge (formerly Rouge Valley Park), the public beach and door-step angling on the lakeshore, and the Cedarbrae Golfcourse.

At the same time, the publicly-owned park area has seen a tremendous increase in more casual, passive visitor use of almost all of its natural areas, resulting in the proliferation of an extensive system of trails. Many of these trails are also used as equestrian trails, used by a commercial stable located on the edge of the Rouge valley north of Highway 2. Erosion and ponding is evident on the trails heavily used by horses.

Other regular activities in the park area include digging up native wildflowers and trees, the harvesting of wild food plants such as Ostrich Fern fiddleheads, Wild Leek, etc., and the dumping of garbage along the valley roadsides.

Agricultural Development

Lands in the study area were cleared by European settlers in the 19th century and this has continued until recently. From the 1930s to the present, 12.8 ha of forests and 10.6 ha of thickets were converted to agriculture. This was concentrated on the uplands between Reesor and Sewells Roads, north of Old Finch Avenue. Forests were lost in the 1930s, 1940s, 1959 and 1964, while some successional thicket areas were recleared in the 1980s.

335 ha of fields were in active tillage in 1990. 24.3 ha of fields were taken out of cultivation in the 1980s. Over 10.8 km of old native hedgerows mark out the pattern of fields.

ii) PRESENT VEGETATION

The Rouge Valley Park study area was approximately 1820 ha in size. The vegetation of the study area consists of a number of major types: **open water and river communities** (58 ha, 3%); **other open and forested wetland communities** (84 ha, 5%); **forested slope communities** (198 ha, 11%); **forested bottomland communities** (161 ha, 9%); **forested tableland communities** (142 ha, 8%); **primary communities** such as river bars, shores and bluffs (20 ha, 1%); and **anthropogenic communities**, including old fields, road and railsides, thickets, early successional forests, hedgerows, plantations, ponds (569 ha, 31%); and **developed lands**, such as orchards, cultivated fields, residences, institutions, and recreational areas (569 ha, 31%) (Table 2).

Overall, anthropogenic and developed lands dominate the Rouge Valley Park (62%). However, in the area south of the CPR railline north of Finch, excluding the Metro Toronto Zoo, diverse, native vegetation communities dominate the valleys and interfluvial tablelands (94%) (Map 2).

The Rouge Valley Park supports an exceptional diversity of vegetation communities because of wide variations in soil moisture, microclimate and successional status. Soil moisture, and the site characteristics causing variation in soil moisture, such as topographic location and aspect, are the most important determinants of vegetation composition.

Wetlands constitute about 8% of the park. Near Lake Ontario, there is a 35 ha lakeshore marsh and several smaller marshes supporting cattail marsh, sedge marsh, Canada Blue-joint (*Calamagrostis canadensis*) meadow marsh, open water submerged and floating aquatics, Speckled Alder (*Alnus rugosa*) thicket swamp, and Water Arum (*Calla palustris*) meadow marsh.

Upstream, a variety of meadow marshes, including the rare Variegated Horsetail (*Equisetum variegatum*) wetland type, occur along the Rouge River and Little Rouge Creek, and in cut-off river meanders. Deciduous swamps of the introduced Crack Willow (*Salix Xrubens*) are also common in the abandoned river meanders. The occasional seepage on valley slope sustains mixed swamps of Hemlock (*Tsuga canadensis*) and White Cedar (*Thuja occidentalis*); Spotted Jewelweed (*Impatiens capenis*) meadow marshes; and thickets of Mountain Maple (*Acer spicatum*), Red-osier Dogwood (*Cornus stolonifera*) and Willow (*Salix* spp.).

Deciduous swamps and a few mixed swamps are scattered on the uplands, particularly on water discharge areas near the Lake Iroquois shoreline. These swamps are largely composed of Silver Maple (*Acer saccharinum*), Green Ash (*Fraxinus pennsylvanica*), White Ash (*Fraxinus americana*), Bur Oak (*Quercus macrocarpa*), White Elm (*Ulmus americana*), and successional stands of Balsam Poplar (*Populus balsamifera*), and Trembling Aspen (*Populus tremuloides*). Meadow marshes also occur on the uplands along intermittent streams and in ephemeral ponds.

Terrestial forests comprise 27% of the study area. These forests are concentrated along the two major river valleys and adjacent uplands south of the CPR railline, and in other isolated tableland woodlots north of that.

In the valleys, the height of a site above the river, and the extent and frequency of flooding, is a major determinant of forest composition (Fig. 9). The lower bottomlands support extensive stands of Manitoba Maple (*Acer negundo*) and the introduced Crack Willow (*Salix Xrubens*), and the occasional forests of White Cedar and Balsam Poplar. Many of these forests are recent, having developed since the 1940s on former pastures and cultivated fields which once dominated the lower terraces. Mid-terrace forests have an admixture of Black Maple (*Acer nigrum*), Sugar Maple (*Acer saccharum*), White Cedar and Hemlock.

The tablelands, the high valley terraces and the valley slopes with mesic soils are dominated by forests of Sugar Maple, and, to a lesser extent, Beech (*Fagus grandifolia*), Hemlock and White Cedar. Hemlock is more or less confined to northfacing slopes and adjacent terraces, while Beech prefers dependably moist southern aspects, and White Cedar stands are restricted to gravelly soils.

Table 2. Areal extent of vegetation communities in the Rouge Valley Park study area, 1990.

		Approximate Size (ha)	Relative Size (%)
WETLAND AND AQUATIC COMMUNITY TYPES		141.9	7.8
1.	Riverine (Rouge River and Little Rouge Creek)	54.4	3.0
2.	Open Water: Submerged and Floating Aquatics	3.8	0.2
3.	Deep Emergent Marsh	11.5	0.6
4.	Shallow Emergent Marsh	4.7	0.3
5.	Meadow Marsh	22.7	1.2
6.	Thicket Swamp	4.4	0.2
7.	Deciduous Swamp	30.1	1.7
8.	Mixed Swamp	4.3	0.2
9.	Seepage Slope Thicket	0.3	–
10.	Seepage Slope Mixed and Conifer Forest	5.7	0.3
TERRESTRIAL COMMUNITY TYPES		521.6	28.7
BOTTOMLAND		160.9	8.8
11.	Thicket	10.9	0.6
12.	Deciduous Forest	112.9	6.2
13.	Mixed Forest	33.1	1.8
14.	Conifer Forest	4.0	0.2
VALLEY SLOPE		198.3	10.9
15.	Dry Deciduous and Mixed Forest	19.5	1.1
16.	Dry Mesic Deciduous Forest	22.8	1.3
17.	Mesic Deciduous Forest	74.3	4.1
18.	Dry Mesic Mixed Forest	5.1	0.3
19.	Mesic Mixed Forest	65.6	3.6
20.	Conifer Forest	11.0	0.6
TABLELAND AND HIGH VALLEY TERRACE		142.0	7.8
21.	Dry Deciduous Forest	4.3	0.2
22.	Dry Mesic Deciduous Forest	22.9	1.3
23.	Mesic Deciduous Forest	75.4	4.1
24.	Dry Mesic Mixed Forest	13.5	0.7
25.	Mesic Mixed Forest	14.4	0.8
26.	Conifer Forest	11.5	0.6
PRIMARY		20.4	1.1
27.	Riverine Gravel/Sand Bar	3.1	0.2
28.	Great Lakes Shoreline	1.1	0.1
29.	Unconsolidated Bluff	16.2	0.9
ANTHROPOGENIC COMMUNITY TYPES		569.3	31.3
30.	Field	389.8	21.4
31.	Thicket	28.9	1.6
32.	Deciduous Successional Forest	89.6	4.9
33.	Mixed Successional Forest	19.3	1.1
34.	Deciduous Hedgerow	14.0	0.8
35.	Mixed and Conifer Hedgerow	1.0	0.1
36.	Deciduous Plantation	2.2	0.1
37.	Mixed and Conifer Plantation	17.4	1.0
38.	Human-made Pond	7.1	0.4
AGRICULTURAL AND URBAN LANDS		568.8	31.3
39.	Orchard	17.3	1.0
40.	Cultivated Field	335.0	18.4
41.	Rural and Suburban Residential and Institutional	36.1	2.0
42.	Industrial	4.1	0.2
43.	Recreational	175.3	9.6
44.	Refuse and Compost Heaps, Fill	1.0	0.1
	Roads	18.2	1.0
	TOTAL AREA	1819.9 ha	

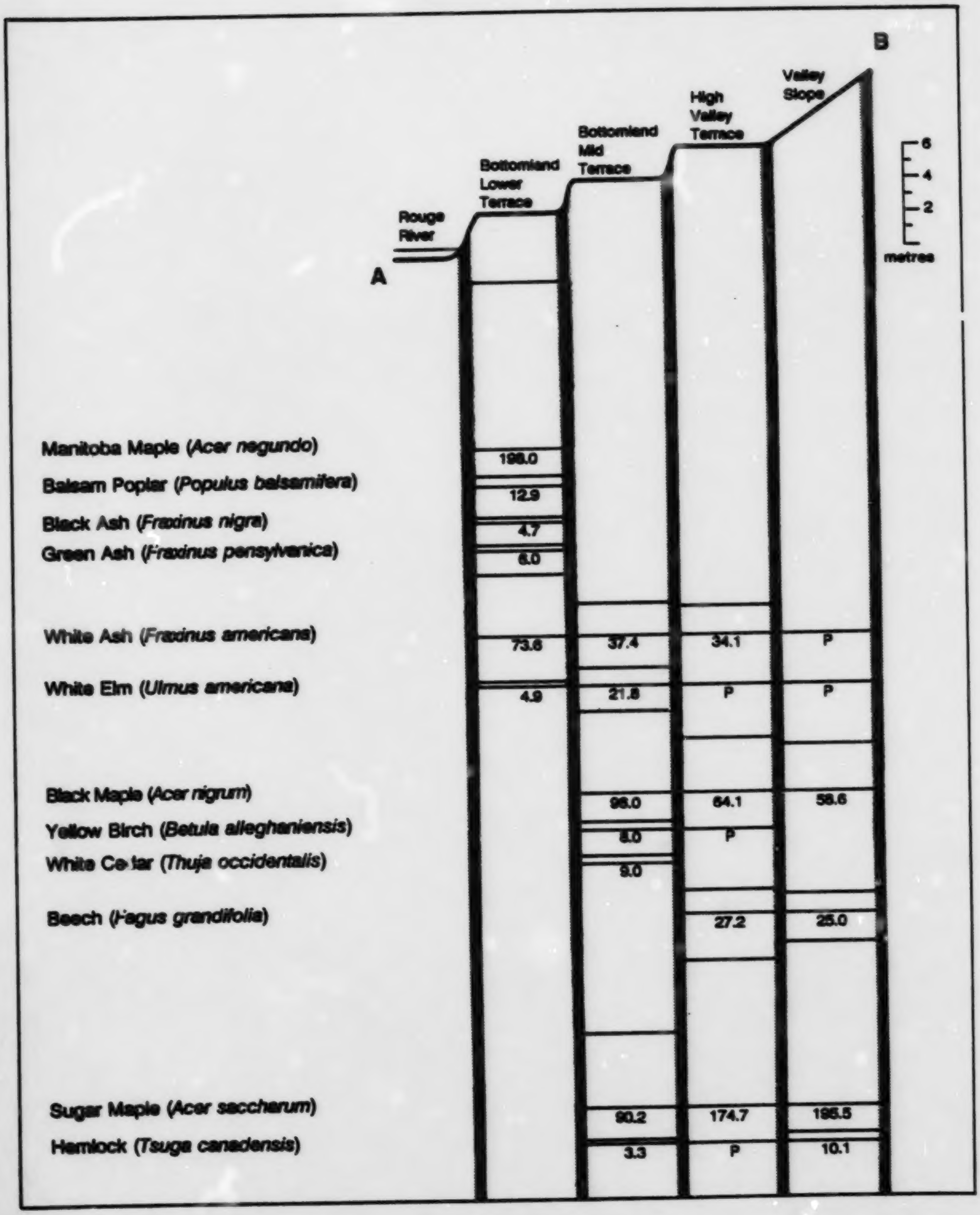

B
Valley Slope
High Valley Terrace
Bottomland Mid Terrace
Bottomland Lower Terrace
Rouge River
A
6
4
2
metres
Manitoba Maple (*Acer negundo*)
Balsam Poplar (*Populus balsamifera*)
Black Ash (*Fraxinus nigra*)
Green Ash (*Fraxinus pensylvanica*)
White Ash (*Fraxinus americana*)
White Elm (*Ulmus americana*)
Black Maple (*Acer nigrum*)
Yellow Birch (*Betula alleghaniensis*)
White Cedar (*Thuja occidentalis*)
Beech (*Fagus grandifolia*)
Sugar Maple (*Acer saccharum*)
Hemlock (*Tsuga canadensis*)
198.0
12.9
4.7
6.0
73.6
37.4
34.1
P
4.9
21.8
P
P
96.0
64.1
58.6
8.0
P
9.0
27.2
25.0
90.2
174.7
195.5
3.3
P
10.1

Figure 9. Distribution of trees (average importance value) and herbaceous species (average percent cover) along a transect of forest stands from river edge to valley rim. (Map 2 has location of transect. P=Present.)

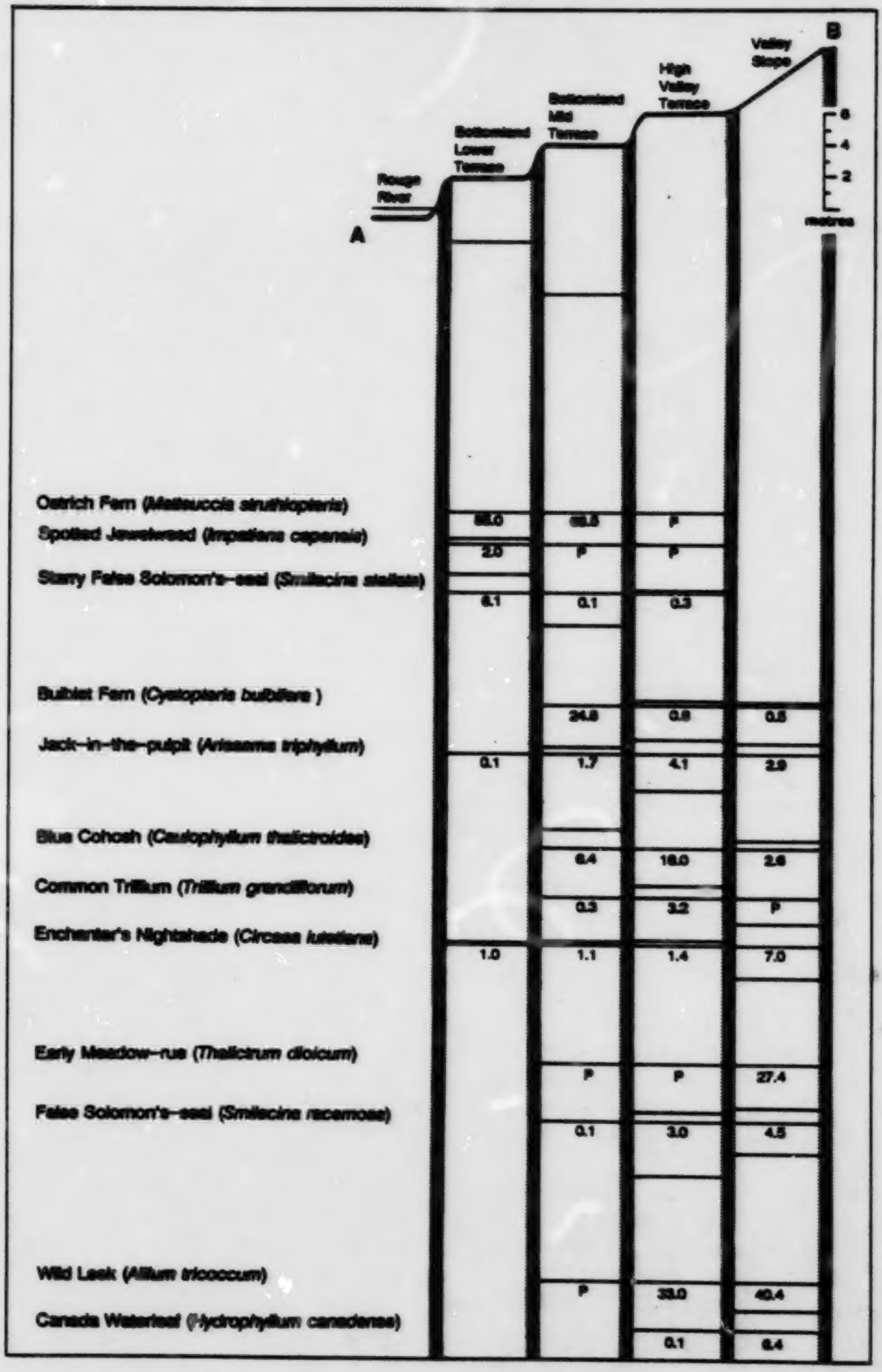

B
Valley Slope
High Valley Terrace
Bottomland Mid Terrace
Bottomland Lower Terrace
Rouge River
A
6
4
2
metres
Ostrich Fern (Matteuccia struthiopteris)
P
Spotted Jewelweed (Impatiens capensis)
2.0
P
P
Starry False Solomon's-seal (Smilacina stellata)
6.1
0.1
0.3
Bulblet Fern (Cystopteris bulbifera)
24.8
0.8
0.5
Jack-in-the-pulpit (Arisaema triphyllum)
0.1
1.7
4.1
2.9
Blue Cohosh (Caulophyllum thalictroides)
6.4
18.0
2.6
Common Trillium (Trillium grandiflorum)
0.3
3.2
P
Enchanter's Nightshade (Circaea lutetiana)
1.0
1.1
1.4
7.0
Early Meadow-rue (Thalictrum dioicum)
P
P
27.4
False Solomon's-seal (Smilacina racemosa)
0.1
3.0
4.5
Wild Leek (Allium tricoccum)
P
33.0
40.4
Canada Waterleaf (Hydrophyllum canadense)
0.1
6.4

Figure 9. (continued)

The excessively drained, dry areas of the valley rims, the southfacing slopes and parts of the tablelands, are dominated by Red Oak (*Quercus rubra*), with Sugar Maple and occasionally White Oak (*Quercus alba*) and Red Maple (*Acer rubrum*) as secondary tree species. Rarely, excessively drained areas on northern slopes or tablelands support mixed forests of Hemlock and White Pine (*Pinus strobus*), or Hemlock and Red Oak.

Successional forests of White Birch (*Betula papyrifera*), Trembling Aspen, Balsam Poplar, White Ash, Green Ash and White Elm are common, covering 6% of the study area. They have colonized clearcuts, former pastures and cultivated fields, many since the 1940s. Other forests are anthropogenic, including the occasional conifer and deciduous plantations.

The most common unforested lands in the park include fields and thickets (23% of the study area) on former agricultural lands, hydro-right-of-ways, road verges and railway embankments. There are also unconsolidated bluffs up to 30 m high, river bars, a few Big Bluestem (*Andropogon gerardi*) prairie-like glades in the oak forests and, along the Lake Ontario shore, a small example of native beach strands and wet meadows.

Agricultural and urban lands make up most of the remaining part of the study area (31%). Cultivated fields with a well developed system of hedgerows, predominate in the northern half of the park. Urban land uses include a few small residential areas, two campgrounds, Metro Toronto Zoo, Cedarbrae Golf Course, a public bathing beach on Lake Ontario, and a car wrecking yard.

Forest Microclimates

The park's high diversity of microclimates reflects local changes in the aspect (direction) of valley slopes, in valley width (narrow valleys are generally cooler), and in proximity to Lake Ontario. For example, mid-summer soil temperature (a conservative, surrogate measure of microclimate) ranges in the park from 15°C on a southwest facing valley slope close to the moderating affects of Lake Ontario, to 11°C on a northfacing, narrow tributary valley slope away from Lake Ontario (Table 3).

Microclimate plays an important role in forest composition. Fig. 10 illustrates the response of the Rouge's three major tree species to slope aspects and, hence, microclimate and soil moisture around the interfluvial upland between Little Rouge Creek and the Rouge River, south of Tywn Rivers Drive. Slope aspect correlates with other microclimatic factors such as light intensity, soil temperature, evaporation and air temperature. These factors generally reach lowest values on the bottom of north facing slopes, and highest values on the top of southfacing slopes. The warmer microclimate of southfacing slopes also reduces soil moisture and results in greater seasonal and daily temperature fluctuations, especially during the spring and fall. West and eastfacing slopes have intermediate microclimates, with westfacing slopes somewhat warmer.

Tree species and their understoreys respond to the changing microclimates along the slopes of the interfluvial upland. Hemlock peaks in numbers on cool slopes orientated to the north or northwest, between 276° and 82°, while Red Oak is a major component of the tree canopy only on warm slopes orientated to the south, southeast and southwest, between 112° and 262°. In contrast, Sugar Maple is a dominant or secondary dominant on all slope aspects, but exhibits a definite peak on normal sites (Fig. 10).

Tree species respond to the site as a whole. For instance, on cool slopes they are responding to lower insolation, lower temperatures, less extreme temperature fluctuations, a shorter growing season, and generally higher moisture levels. The correlation of moisture with microclimate may be an important factor. Rogers (1978) has noted that Hemlock's preference for northfacing slopes may be due to lower evaporation rates keeping rooting-zone soils dependably moist for this shallowly rooted tree species.

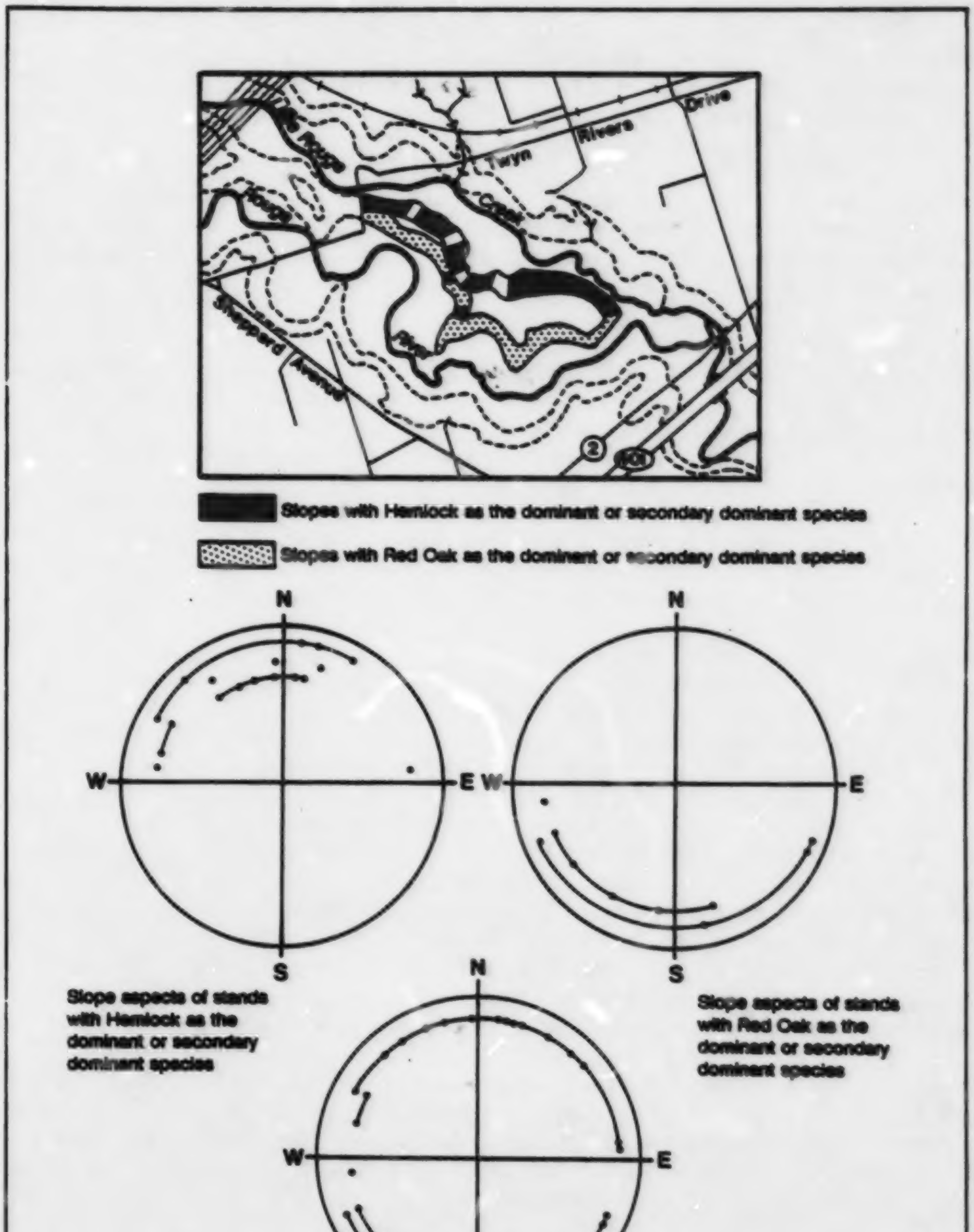

Drive
Twyn Rivers
Rouge
Creek
Rouge
River
Sheppard Avenue
2
401
▇ Slopes with Hemlock as the dominant or secondary dominant species
▨ Slopes with Red Oak as the dominant or secondary dominant species
N
W
E
S
Slope aspects of stands with Hemlock as the dominant or secondary dominant species
N
W
E
S
Slope aspects of stands with Red Oak as the dominant or secondary dominant species
N
W
E
S
Slope aspects of stands with Sugar Maple as the dominant or secondary dominant species

Figure 10. Distribution and slope aspects of Hemlock, Red Oak, and Sugar Maple slope forests around the interfluvial tableland (hog's back) between the Rouge River and Little Rouge Creek south of Twyn Rivers Drive.

Forest Succession

The presettlement forests of the park were dominated by the same species as in the present forests, but in different proportions and with a much greater array of stand ages. Fire was an agent in maintaining open, dry forests, while the strong presence of Hemlock and White Pine in mixed deciduous forests suggests very old stands in comparison to those of today.

During European settlement, forest clearing, farming, mills, river diversions, aggregate removal and other land uses decimated the forests of the park over a period of three or four human generations. While these activities also had profound effects on the remaining natural areas of the park, the continuity of the species and their biological requirements were maintained in the forests, and their process of succession goes on.

The natural process of successional change in the park's modern forests can be interpreted from the present composition, ages and size class distribution of trees and saplings in 12 stands sampled quantitatively in the park (Fig. 11, Table 3; Varga 1984, Riley and Varga 1980). Tree ages were taken from two stands; for the remainder, tree size was used as a surrogate value for tree age. With light-demanding species like oak, poplar and pine, this correlation is more accurate than with shade tolerant species like Hemlock and Sugar Maple, the growth of which is often suppressed in the subcanopy.

The three major successional trends in the park's forests are: i) a trend towards Manitoba Maple forests on bottomland terraces between one and four metres above the river; ii) a trend towards Sugar Maple and Beech forests on normal and warmer uplands; and iii) a trend towards Hemlock forests on cooler uplands.

In three bottomland stands, the distribution of sapling and tree size classes suggests a successional trend from forests dominated by the light-demanding Crack Willow and Balsam Poplar, towards dominance by the more shade-tolerant Manitoba Maple, White Ash and White Elm (R13, 14; Fig. 11). This is supported by the prominence of the latter three species in the sapling layer of the young Crack Willow - Balsam Poplar stand (R14), and by their self-perpetuation in the older Manitoba Maple - White Ash stand (R11).

The combination of frequent floods on the post-settlement Rouge River floodplain, and the aggressive expansion of Manitoba Maple in this region, has shifted the balance towards deciduous, rather than conifer, bottomland forests. For example, a White Cedar bottomland stand (R13) has Manitoba Maple and White Ash exhibiting a proportionally greater role in the sapling layer (R13). Large areas of bottomland along Little Rouge Creek consist of dead cedars overtopped by a new canopy of Manitoba Maple. A faster growing species with the ability to spread by seed and by suckering windfalls, Manitoba Maple is adapted to the more intense and frequent flood cycles on near-urban watersheds. The bottomlands of the Little Rouge Creek north of Highway 2 are now dominated by Manitoba Maple, but were open fields as recently as the late 1950s (R.D.H.P. 1956).

The eight deciduous upland stands on normal and warmer sites are increasingly shifting to Sugar Maple (R3,6-10; Fig. 11), with Beech maintaining itself on warmer, mesic sites (R5; Fig. 11). Although White Ash is occasionally prominent in the sapling layer, it is largely confined to intermediate and early successional forests with a relatively open canopy. Inexplicably, the shade tolerant Black Maple, a codominant with Sugar Maple in three stands, is absent or doing poorly in the sapling layer.

One oak stand (R3) clearly shows the trend towards Sugar Maple. Here the major trees were cored and aged, with White Oak 103 to 133 years old, Red Oak 99 to 143 years old, and White Pine 70 to 118 years old. White Ash and Sugar Maple exhibit a larger age spread, and dominate the sapling layer. One can postulate an early forest of widely spaced Red Oak, White Oak, Sugar Maple and White Ash, with the light-demanding oaks continuing to regenerate under a relatively open canopy. On steep slopes like those encountered in Stand R3, a solid tree canopy is rarely formed, and light penetration from the side is enhanced (Curtis 1959).

The relatively open canopy would also have been maintained by periodic ground fires, as indicated in historic records. The fires scarred some of the oaks and may have killed some trees. Charcoal in the soil profile also indicates the presence of fires. The younger White Pines may have entered the stand following these fires. As the stand matured and the canopy closed, and as fires were prevented, the balance shifted in favour of the shade tolerant Sugar Maple and White Ash. At a canopy cover of 84%, the stand is approaching the 85% canopy cover threshold restricting White Oak reproduction, and the 88 to 90% threshold for Red Oak reproduction (Curtis 1959).

The three upland mixed stands on cool sites are characterized by self-perpetuation of Hemlock (R1,2,4; Fig. 11). Hemlock is proportionately better represented among saplings and small trees, suggesting that Hemlock will gradually increase in importance. In one of the mixed stands, a dry mesic White Pine and Hemlock forest (R2), the major tree species were cored and aged. White Pine was relatively even-aged, 110 to 120 years old. Hemlock exhibited a large spread in ages, and the relatively small sized Black Cherry, White Ash and Red Oak were a maximum of 50 years old. These latter species are largely confined to small clearings.

These ages suggest that White Pine stands were initiated on burned-over areas and abundant charcoal is evident in the soil profiles. Although long lived, the lack of White Pine in the sapling layer suggests a gradual decline in importance for this light-demanding pine. Meanwhile, shade tolerant species such as, Hemlock, White Cedar and Sugar Maple have gradually increased in importance over the years.

The natural succession of forests in the Rouge Valley Park should, over the next 50 years, see maturing secondary forests aging to old growth forests. In park forests that are already 100 to 150 years old, several processes may become increasingly important.

i) The increase of soil organic matter and of overstorey cover, leading to more mesic conditions in many presently dry forests, and an attendent shift in species composition.

ii) The increase of woody litter and structural dead wood in forests and thickets, changing the habitat characteristics of such sites for herpetile and insect populations, and for insectivorous birds and other wildlife.

iii) The increase of Hemlock in the forests, perhaps reacting to more mesic site conditions and recovering to historic levels.

iv) The increase of Sugar Maple and Beech on oak-dominated slopes and valley crests, as mesification occurs.

v) The decrease in oak (and perhaps pine) regeneration in existing oak stands.

These processes, which are underway in the park's forests, are well known phenomena of the eastern deciduous forests (Boerner and Kooser 1991), so much so that Curtis said, "The indications are clear that **only the climax mesic forests** have the ability of ever regaining their initial composition under full protection, with all other communities certain to be permanently different" (1959). Fortunately, in the park, many early successional stands and potential restoration areas exist, and all successional phases could persist into the foreseeable future, including the drier site types, such as oak and pine, if deliberate efforts are made.

Finally, natural disturbances would have been part of the historic dynamics of forest regeneration in the area, for example, fire, floods, weather events and small-scale land clearing for crops and villages. While these may not occur again in the park to the same degree, other natural disturbances will occur, including forest disease (Gypsy Moth, for example), windfalls, and sleet storms. These and other processes may also maintain open, dry conditions in stands, either through overstorey thinning, by forest pathogens, or through drought stress as local climates warm (Peters and Darling 1985, Sedjo 1989).

Table 3. **Tree, shrub and understorey composition, and environmental parameters for fourteen forest stands in the Rouge Valley Park.**

(Trees were sampled by the point-quarter method; for major species, an 'importance value', out of a possible 300, is indicated. In the understorey, shrubs and herbs were sampled by random one-metre square quadrants; average percent cover is noted for major species. Environmental parameters were also sampled for each stand: microclimate (based on mid-summer average soil temperature), soil type, and soil pH. Refer Map 2 for stand locations.) (Varga 1984)

Stand R1 (Community Type 19a)
Tree layer: *Tsuga canadensis* 136, *Acer saccharum* 90, *Betula alleghaniensis* 25.
Herbaceous layer: *Streptopus roseus* 5.3, *Cystopteris bulbifera* 5.0, *Dryopteris intermedia* 3.7, *Polystichum acrostichoides* 1.3, *Maianthemum canadense* var. *canadense* 0.7.
Soil Type: Sandy Loam, Soil pH: 5.5, Microclimate: 11°C (colder-than-normal)

Stand R2 (Community Type 18b)
Tree layer: *Pinus strobus* 128, *Tsuga canadensis* 69, *Thuja occidentalis* 22.
Herbaceous layer: *Solidago caesia* 6.7, *Maianthemun canadense* var. *canadense* 5.3, *Aster macrophyllus* 3.2, *Carex pensylvanica* 2.8, *Smilacina racemosa* 1.3.
Soil Type: Sandy Loam, Soil pH: 7.2, Microclimate: 12.3°C (colder-than-normal)

Stand R3 (Community Type 15a)
Tree layer: *Quercus rubra* 160, *Acer saccharum* 38, *Quercus alba* 34, *Pinus strobus* 26.
Shrub layer: *Symphoricarpos albus* 7.9, *Cornus rugosa* 5.3, *Prunus virginiana* 2.9, *Diervilla lonicera* 2.7, *Hamamelis virginiana* 2.3.
Herbaceous layer: *Thalictrum dioicum* 16.1, *Solidago caesia* 12.5, *Carex pensylvanica* 11.6, *Desmodium glutinosum* 7.7, *Geranium maculatum* 7.5. *Smilacina racemosa* 6.4, *Smilacina stellata* 5.8.
Soil Type: Clay Loam, Soil pH: 7.8, Microclimate: 15°C (warmer-than-normal)

Stand R4 (Community Type 19d)
Tree layer: *Thuja occidentalis* 142, *Tsuga canadensis* 63.
Herbaceous layer: *Cystopteris bulbifera* 7.5, *Smilacina racemosa* 5.9, *Solidago caesia* 2.6, *Solidago flexicaulis* 2.4, *Rhus radicans* subsp. *radicans* 1.1.
Soil Type: Clay Loam, Soil pH: 7.8, Microclimate: 11.8°C (colder-than-normal)

Stand R5 (Community Type 17c)
Tree layer: *Fagus grandifolia* 125, *Acer saccharin* 100.
Shrub layer: *Hamamelis virginiana* 6.0, *Corylus cornuta* 4.3, *Cornus alternifolia* 1.5.
Herbaceous layer: *Solidago flexicaulis* 10.0, *Podophyllum peltatum* 8.7, *Sanguinaria canadensis* 6.7, *Eupatorium rugosum* 6.2, *Solidago caesia* 5.5.
Soil Type: Loam, Soil pH: 7.2-7.5, Microclimate: 14.3°C (warmer-than-normal)

Stand R6 (Community Type 23b)
Tree layer: *Acer saccharum* 242, *Fraxinus americana* 26, *Fagus grandifolia* 22.
Herbaceous layer: *Caulophyllum thalictroides* 25.5, *Circaea lutetiana* 4.6, *Hydrophyllum canadense* 4.1, *Sanguinaria canadensis* 4.0, *Hydrophyllum virginianum* 2.9.
Soil Type: Loam, Soil pH: 7.8, Microclimate: 13°C (normal)

Table 3. (continued)

Stand R7 (Community Type 32a)
Tree layer: *Betula papyrifera* 132, *Populus grandidentata* 67, *Fraxinus americana* 66, *Prunus serotina* 33.
Shrub layer: *Cornus rugosa* 20.3, *Cornus alternifolia* 1.7, *Prunus virginiana* 1.1.
Herbaceous layer: *Solidago caesia* 11.4, *Smilacina racemosa* 8.5, *Aster macrophyllus* 4.4, *Solidago flexicaulis* 4.1, *Maianthemun canadense* var. *canadense* 3.6..
Soil Type: Sandy Loam, Soil pH: 7.2-7.5, Microclimate: 14.3°C (warmer-than-normal)

Stand R8 (Community Type 22a)
Tree layer: *Quercus rubra* 113, *Acer saccharum* 83, Acer rubrum 44, *Betula papyrifera* 30.
Shrub layer: *Cornus rugosa* 19.5, *Hamamelis virginiana* 10.0, *Prunus virginiana* 1.1.
Herbaceous layer: *Pteridium aquilinum* 9.0, *Aster macrophyllus* 7.0, *Trillium grandiflorum* 5.5, *Polygonatum pubescens* 4.7, *Prenanthes altissima* 4.5.
Soil Type: Sandy Loam, Soil pH: 7.2-7.5, Microclimate: 13.9°C (warmer-than-normal)

Stand R9 (Community Type 23a)
Tree layer: *Acer saccharum* 175, *Acer nigrum* 64, *Fraxinus americana* 34, *Fagus grandifolia* 27.
Shrub layer: *Parthenocissus inserta* 7.5.
Herbaceous layer: *Allium tricoccum* 33.0, *Caulophyllum thalictroides* 18.0, *Arisaema triphyllum* 4.1, *Trillium grandiflorum* 3.2, *Smilacina racemosa* 3.0.
Soil Type: Loam, Soil pH: 7.8, Microclimate: 13.2°C (normal)

Stand R10 (Community Type 12e)
Tree layer: *Acer nigrum* 96, *Acer saccharum* 90, *Fraxinus americana* 37, *Ulmus americana* 22.
Herbaceous layer: *Matteuccia struthiopteris* 68.5, *Cystopteris bulbifera* 24.8, *Caulophyllum thalictroides* 6.4, *Asarum canadense* 3.0, *Arisaema triphyllum* 1.7.
Soil Type: Loam, Soil pH: 7.8, Microclimate: 13.5°C (normal)

Stand R11 (Community Type 12b)
Tree layer: *Acer negundo* 127, *Fraxinus americana* 61.
Shrub layer: *Ribes americanum* 6.6, *Cornus alternifolia* 3.5, *Prunus virginiana* 2.5.
Herbaceous layer: *Matteuccia struthiopteris* 85.0, *Smilacina stellata* 6.1, *Impatiens capensis* 2.0, *Circaea lutetiana* 1.0, *Thalictrum polygamum* 1.0.
Soil Type: Silt, Soil pH: 7.8, Microclimate: 14.5°C (warmer-than-normal)

Stand R12 (Community Type 17a)
Tree layer: *Acer saccharum* 196, *Acer nigrum* 59, *Fagus grandifolia* 25.
Herbaceous layer: *Allium tricoccum* 40.4, *Thalictrum dioicum* 27.4, *Circaea lutetiana* 6.9, *Hydrophyllum canadense* 6.3, *Smilacina racemosa* 4.4.
Soil Type: Loam, Soil pH: 7.8, Microclimate: 13.5°C (normal)

Stand R13 (Community Type 13a)
Tree layer: *Thuja occidentalis* 202, *Salix fragilis* 21.
Herbaceous layer: *Matteuccia struthiopteris* 67.4, *Cystopteris bulbifera* 20.7, *Tussilago farfara* 1.5, *Impatiens capensis* 1.4, *Arisaema triphyllum* 0.4.
Soil Type: Silt, Soil pH: 7.8, Microclimate: 12°C (colder-than-normal)

Stand R14 (Community Type 12c)
Tree layer: *Salix fragilis* 150, *Populus balsamifera* 76, *Ulmus americana* 44, *Acer negundo* 31.
Herbaceous layer: *Matteuccia struthiopteris* 77.0, *Onoclea sensibilis* 9.8, *Thalictrum polygamum* 4.9, *Equisetum arvense* 2.1.
Soil Type: Silt, Soil pH: 7.8, Microclimate: 13°C (normal)

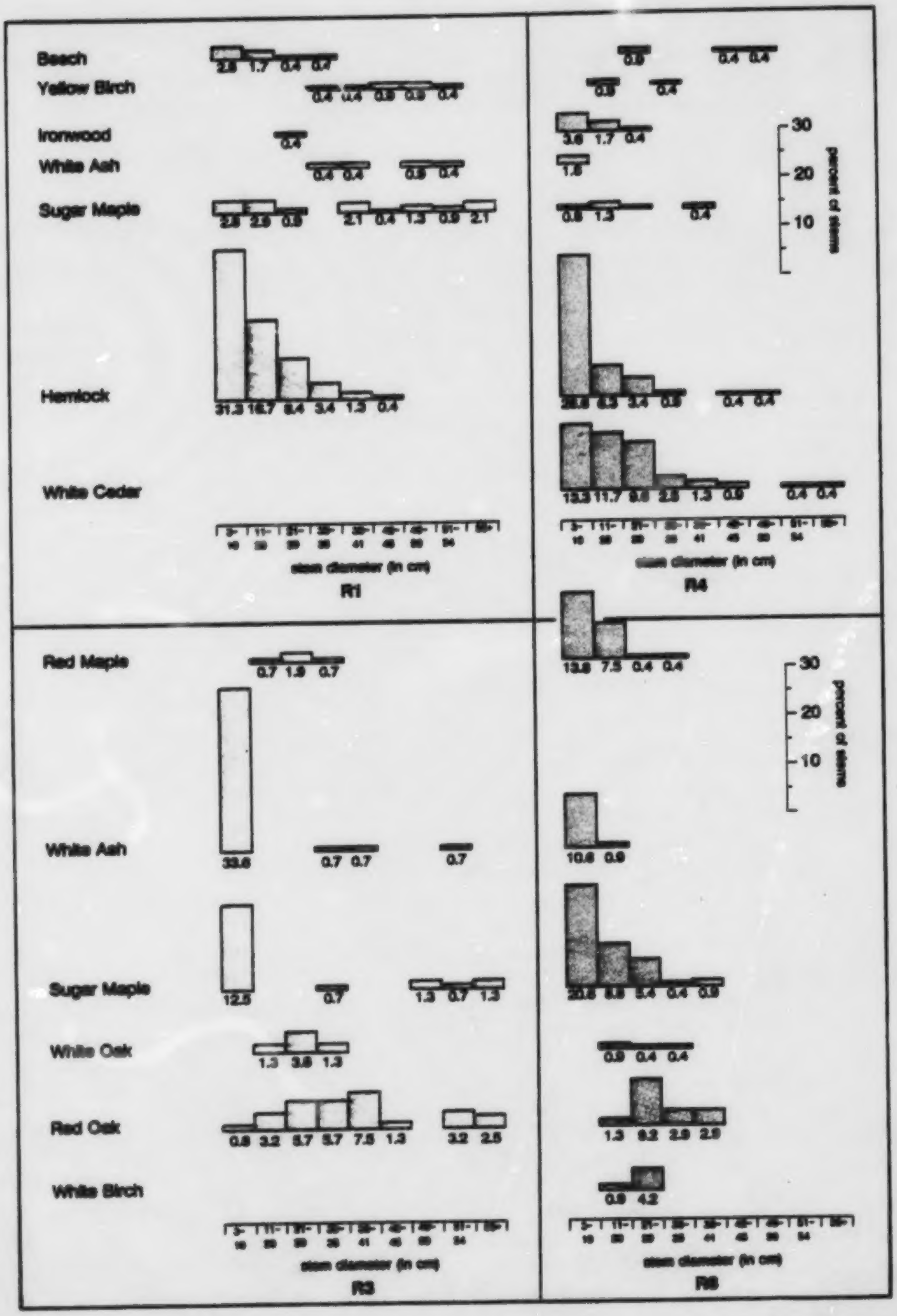


Figure 11. Forest tree and sapling composition for twelve forest stands in the Rouge Valley Park (Refer Map 2 for stand locations.)

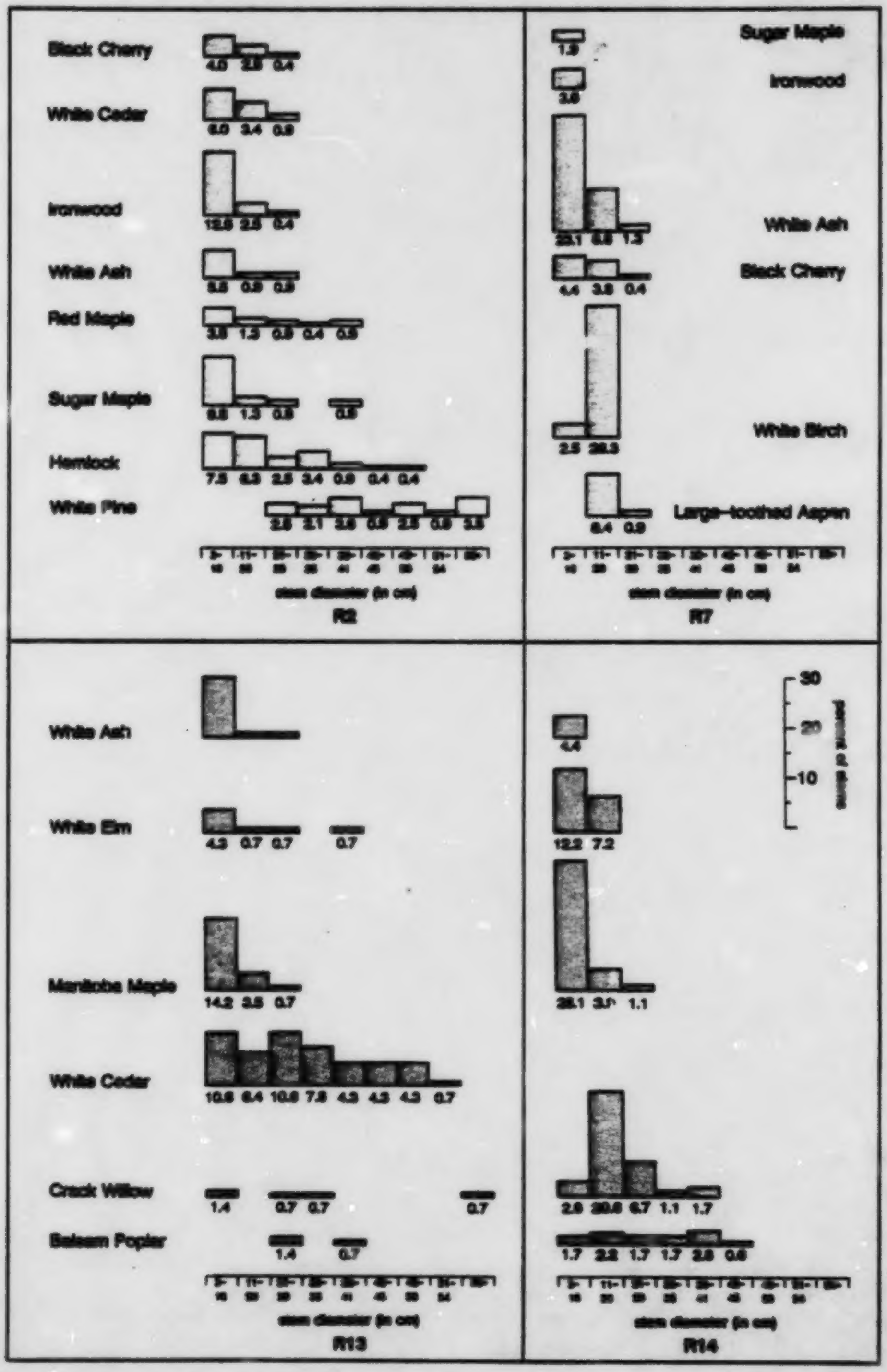


Figure 11. (continued)

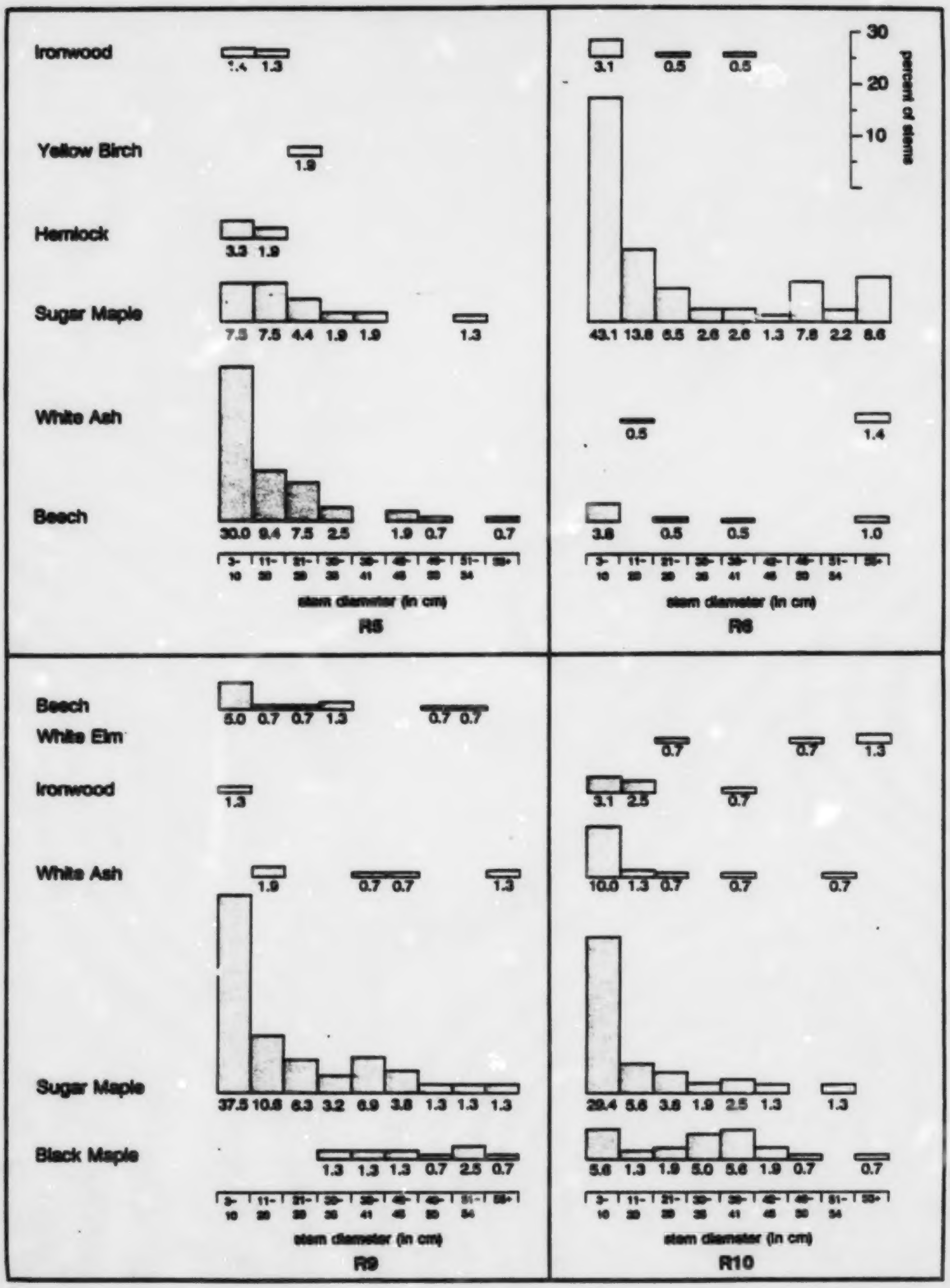


Figure 11. (continued)

Community Descriptions

There are 133 community types (CT) within the Rouge Valley Park, grouped under 4 major headings: wetlands and aquatics; terrestial; anthropogenic; and agricultural and urban lands. The communities are outlined on Map 2. Because they are relatively few distinct boundaries in nature, the boundaries of community types on Map 2 should be regarded as best approximations.

In the following treatment, the tree, sapling, shrub, herbaceous, and graminoid layers are described for each community, with a brief outline of the soil type, soil moisture, microclimate, physical features, location in the study area, and significant plant species. Significant species include those that are nationally rare, provincially rare, regionally rare (rare in the regional municipalities of York and Metropolitan Toronto), and locally rare (rare in Metro Toronto and restricted to a few sites in the park). The areal extent of the various communities is on Table 2.

Quantitative data on vegetation communities has been collected for 14 forest stands using the point-quarter method for the tree and sapling layers, and one metre square quadrats for the shrub, tree seedling and herbaceous layers (Varga 1984, Riley and Varga 1984). The locations of these stands are noted in Map 2, and the major species are summarized in Table 3. For each stand, environmental parameters were also assessed: soil type, soil pH, summer soil temperature (a conservative estimate of microclimate), and soil moisture (Table 3).

WETLAND AND AQUATIC COMMUNITY TYPES

Wetlands and aquatic communities cover approximately 8% of the Rouge Valley Park. They are situated in the lakeshore marsh, the river, abandoned river meanders, ephemeral ponds, seepage zones on valley slopes, river shores, along intermittent streams, and in upland water discharge areas.

1. **Riverine (Rouge River, Little Rouge Creek)**
    a. **Shallow rocky riverine**
    b. **Deep turbid riverine**
    c. **Oxbow channel**
    d. **Pond**

Upstream of their confluence, the Rouge River and Little Rouge Creek flow in a wide, shallow riverbed over rocky substrates (CT 1a). South of the confluence at Highway 2, the river is effectively at Lake Ontario levels, which causes the deposition of fine sediments on the river bed. Here the Rouge River is very wide, up to 2 m deep, and flows through deep silt sediments (CT 1b).

Some of the river meanders are cut-off, creating oxbow channels (CT 1c). There are three oxbow channels in the park with permanent standing water. Two are located south of Highway 2 to the west of the existing river channel. These oxbows were the main river channel during the 1800s, as late as the 1920s. A third oxbow channel is located on the west side of the Rouge River, north of the CPR line.

Several permanent ponds appear to have developed naturally in the park. There is a small remnant pond on the Lake Ontario shore, and a pond on the bottomlands of the Little Rouge Creek just south of the Beare Road landfill access road. The latter pond may be the result of gravel extraction in the area. A number of ephemeral ponds are scattered through the uplands north of Finch Avenue and on high valley terraces such as those south of Finch Avenue; these are meadow marshes (CT 5e, 5f, 5h). They contain standing water in the spring, dry out by the summer, and support a dense mat of meadow marsh vegetation. During exceptionally wet years, some of the ephemeral ponds may retain water throughout the year.

Few vascular plants occur in the riverine habitats. There are only small patches of pondweeds (*Potamogeton pusillus*, *P. crispus*), and Waterweed (*Elodea canadensis*).

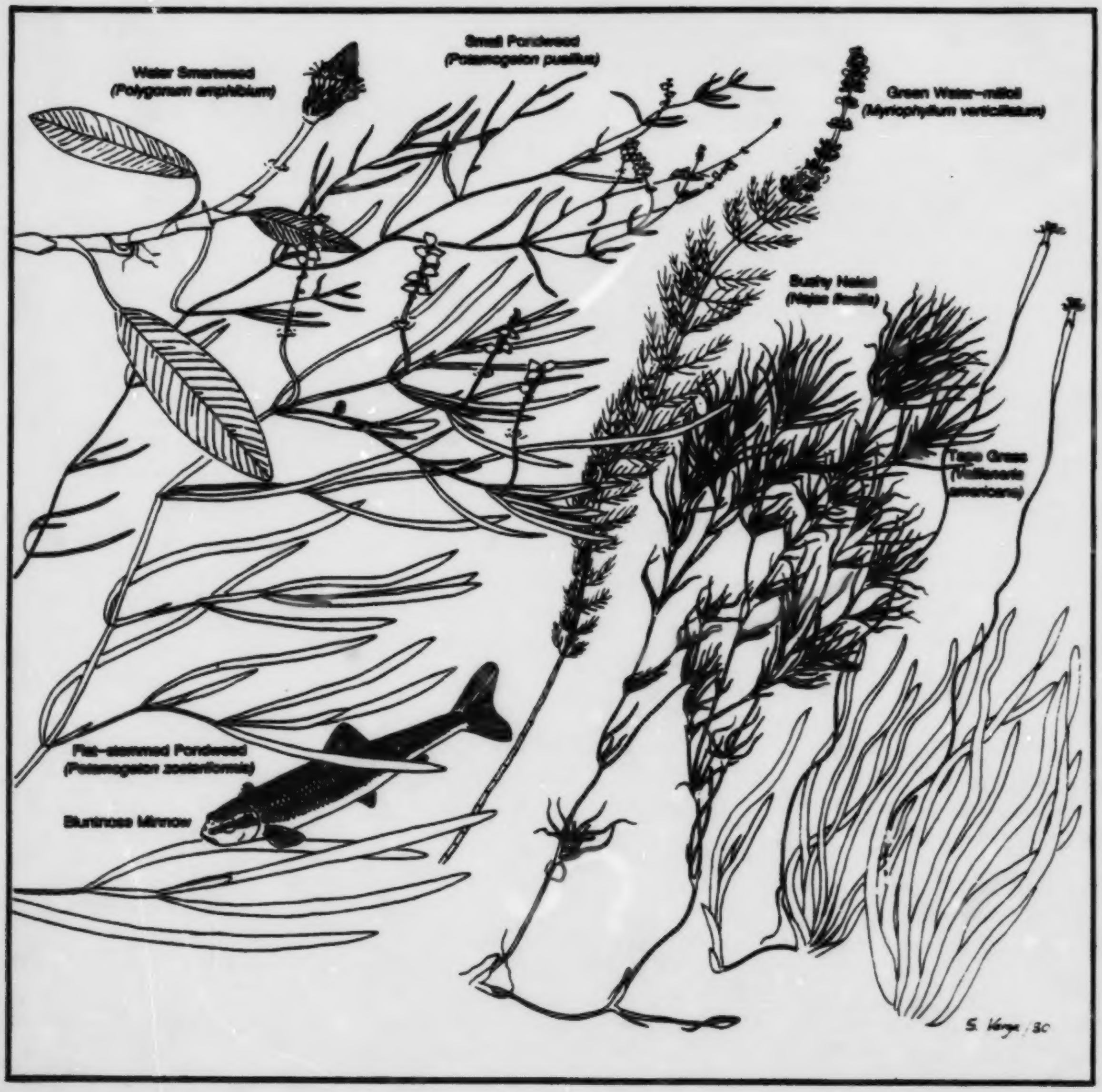

Water Smartweed
(Polygonum amphibium)
Small Pondweed
(Potamogeton pusillus)
Green Water-milfoil
(Myriophyllum verticillatum)
Bushy Naiad
(Najas flexilis)
Tape Grass
(Vallisneria
americana)
Flat-stemmed Pondweed
(Potamogeton zosteriformis)
Bluntnose Minnow

Figure 12. Plants of the submerged aquatic community (CT 2) in the open waters of the lakefront marsh.

2. Open Water: Submerged and Floating Aquatics

Submerged and floating aquatic communities are found in the channels, ponds and embayments of the lakefront marsh. Water depths range from 0.1 to 3 meters and fluctuates both seasonally and over the longer term in response to changing Lake Ontario water levels (Chapter II.vi).

The diversity and extent of the submerged aquatic community has declined markedly over the past two decades. In 1973, submerged aquatics formed dense beds over large portions of open water in the lakefront marsh. By 1988 and 1990, however, submergent aquatic beds were limited to a few small channels. Submerged aquatic communities are known to be highly sensitive to lake level fluctuations, eutrophication and sediment loads (Crowder and Bristow 1988).

Submergents are generally more abundant during high lake levels, such as the near record high waters of 1973, a positive response to increased open water habitat. Sewage and agricultural inputs of phosphorus and nitrogen have indirectly decreased light penetration and changed the specific conductivity of water in many marshes on the lower Great Lakes, resulting in a dieback of native submergent aquatics (Crowder and Bristow 1988). Elevated sediment loadings caused by urban development and intensive agriculture have also increased turbidity in such Lake Ontario marshes as Oshawa Second Marsh (Cecile 1983) and Cootes Paradise (Sismer 1979, McLarty and Thachuk 1986). Crowder and Bristow (1988) noted that the resulting lower light levels are sufficient to kill off submerged aquatics. This loss of submerged aquatics allows the resuspension of fine sediments, which in turn prevents the recolonization of submergents and negatively affects fish and aquatic invertebrate populations (Janecek 1988).

Presently, two channels of deeper water in the northwest portion of the lakefront marsh contain the only remaining rich assemblage of submerged and floating aquatics. The following species are prevalent: Bullhead Lily (*Nuphar variegata*), Fragrant Water-lily (*Nymphaea odorata*), the pondweeds (*Potamogeton pectinatus, P. zosteriformis*), Common Bladderwort (*Utricularia vulgaris*), Water Smartweed (*Polygonum amphibium*), Waterweed (*Elodea canadensis*) and Green Water-milfoil (*Myriophyllum verticillatum*). Less frequent species include: Curly-leaved Pondweed (*Potamogeton crispus*), Tape Grass (*Vallisneria americana*), and Bushy Naiad (*Najas flexilis*).

Shallow ponds and embayments in the lakefront marsh have dense floating beds of Bullhead Lily and Fragrant Water-lily, with the Sago Pondweed (*Potamogeton pectinatus*) a common submergent.

Significant species: one locally rare species, the Green Fruited Bur-reed (*Sparganium chlorocarpum*), and seven regionally rare species including: an arrowhead (*Sagittaria cuneata*) White Water-crowfoot (*Ranunculus longrirostis*), the water-milfoils (*Myriophyllum exalbescens, M. verticillatum*) Water Star-grass (*Heteranthera dubia*) and Tape Grass (*Vallisneria americana*).

3. Deep Emergent Marsh: Broad-leaved Cattail

The Broad-leaved Cattail (*Typha latifolia*) and Hybrid Cattail (*Typha Xglauca*) marsh is the most common wetland type in the lakefront marsh. It occupies areas of standing water up to 50 cm deep, depending on the current lake levels. Several small stands also occur upstream.

From year to year, the location and areal extent of cattail marsh varies greatly. Cattails are highly sensitive to fluctuating Lake Ontario water levels. During high lake levels, large areas of cattail marsh in deeper waters will die back. Correspondingly, cattails invade and supplant the once drier meadow marsh communities on the landward edge.

In the lakefront marsh, extensive stands of Broad-leaved Cattail and Hybrid Cattail form a monoculture in the deep waters. Towards the drier edges, Canada Blue-joint (*Calamagrostis canadensis*) can share dominance. In the northeast corner of the marsh, Sweet Flag (*Acorus calamus*) also co-dominates with cattails. Minor

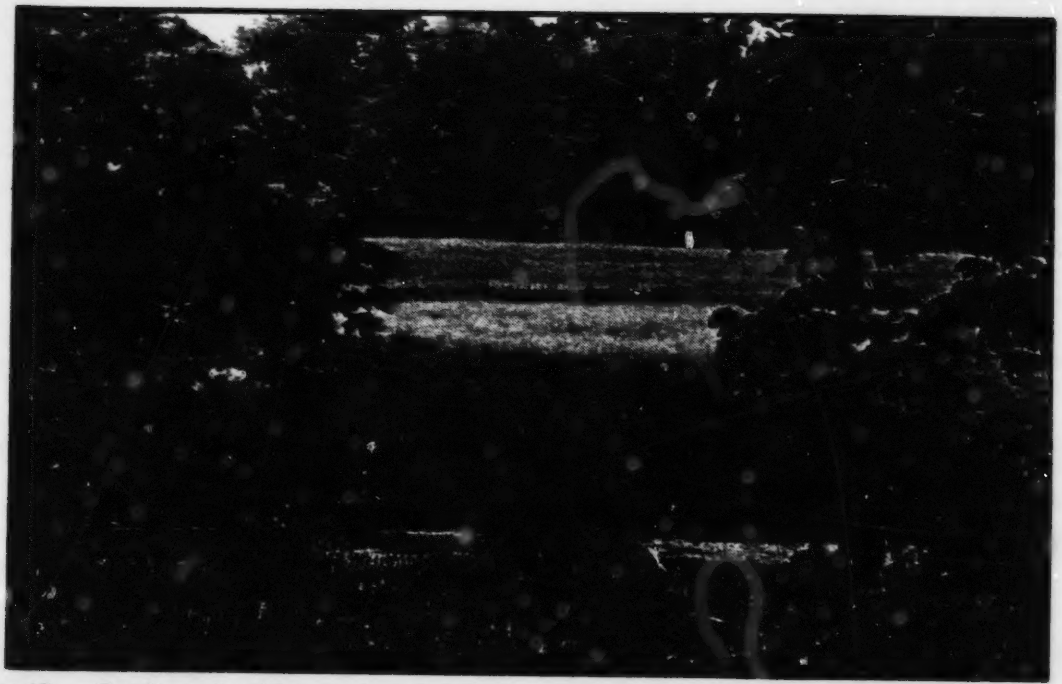


Figure 13. Cattail marsh, with open channels in northwest corner of the lakeshore marsh (CT 3) (JLR 1991).

Figure 14. Canada Bluejoint meadow marsh along the back reaches of the lakeshore marsh (CT 5a) (JLR 1979).

associates include: Spotted Jewelweed (*Impatiens capensis*), the arrowheads (*Sagittaria latifolia*, *S. cuneata*), Great Water Dock (*Rumex orbiculatus*), Bulbous Water-hemlock (*Cicuta bulbifera*) smartweeds (*Polygonum amphibium*, *P. punctatum*), Narrow-leaved Cattail (*Typha angustifolia*), Water-plantain (*Alisma plantago-aquatica*) and Giant Bur-reed (*Sparganium eurycarpum*).

Significant species: four regionally rare species: an arrowhead (*Sagittaria cuneata*), Sweet Flag (*Acorus calamus*), a smartweed (*Polygonum punctatum*) and River Bulrush (*Scirpus fluviatilis*); and the locally rare bedstraw (*Galium trifidum* var. *trifidum*).

4. Shallow Emergent Marsh

a. Sedge

Sedge marshes are restricted to the lakefront marsh, except for one small area on the west side of the Rouge River, just south of Highway 401. They occupy sites intermediate in moisture between the drier meadow marshes and the wetter cattail marshes. Standing water, generally less than 50 cm, is present throughout most of the year.

Carex lacutris is the dominant sedge, sometimes occurring in combination with *Carex stricta*. Towards the wetter end, Broad-leaved Cattail (*Typha latifolia*) can also be a common associate, while towards the drier end, Canada Blue-joint (*Calamagrostis canadensis*) can be a secondary species or a co-dominant with the sedges. Other common species include: Spotted Jewelweed (*Impatiens capensis*) and to a lesser extent Great Water Dock (*Rumex orbiculatus*), Canada Thistle (*Cirsium arvense*) and River Bulrush (*Scirpus fluviatilis*).

Significant species: the regionally rare Sweet Flag (*Acorus calamus*) and the River Bulrush (*Scirpus fluviatilis*); and locally rare bedstraw (*Galium trifidum* var. *trifidum*).

b. Narrow-leaved Cattail

Narrow-leaved Cattail (*Typha angustifolia*) marshes occur throughout the park in oxbow channels, ditches, and small depressions on farm fields. Common secondary species include: Spotted Jewelweed (*Impatiens capensis*), Common Reed (*Phragmites australis*), Canary Reed Grass (*Phalaris arundinacea*), Sensitive Fern (*Onoclea sensibilis*), Field Horsetail (*Equisetum arvense*) and Purple Loosestrife (*Lythrum salicaria*).

5. Meadow Marsh

a. Canada Blue-joint

The most common meadow marsh community in the park, Canada Blue-joint (*Calamagrostis canadensis*), is largely confined to the drier edges of the lakefront marsh. Standing water is often present in the spring, particularly during high lake level years, but is absent during the summer months.

On the wetter edge of this community, the sedges (*Carex stricta*, *C. lacustris*), Broad-leaved Cattail (*Typha latifolia*), Canada Thistle (*Cirsium arvense*) and Purple Loosestrife (*Lythrum salicaria*) can be secondary associates. On levees and the drier margins of the lakefront marsh, secondary species include: Canada Goldenrod (*Solidago canadensis*), Boneset (*Eupatorium perfoliatum*), Joe-pye-weed (*Eupatorium maculatum*), Spotted Jewelweed (*Impatiens capensis*), Raspberry (*Rubus strigosus*) and Riverbank Grape (*Vitis riparia*).

Significant species: the locally rare Great St. John's-wort (*Hypericum ascyron*) and bedstraw (*Galium trifidum* var. *trifidum*); and the regionally rare Angelica (*Angelica atropurpurea*).

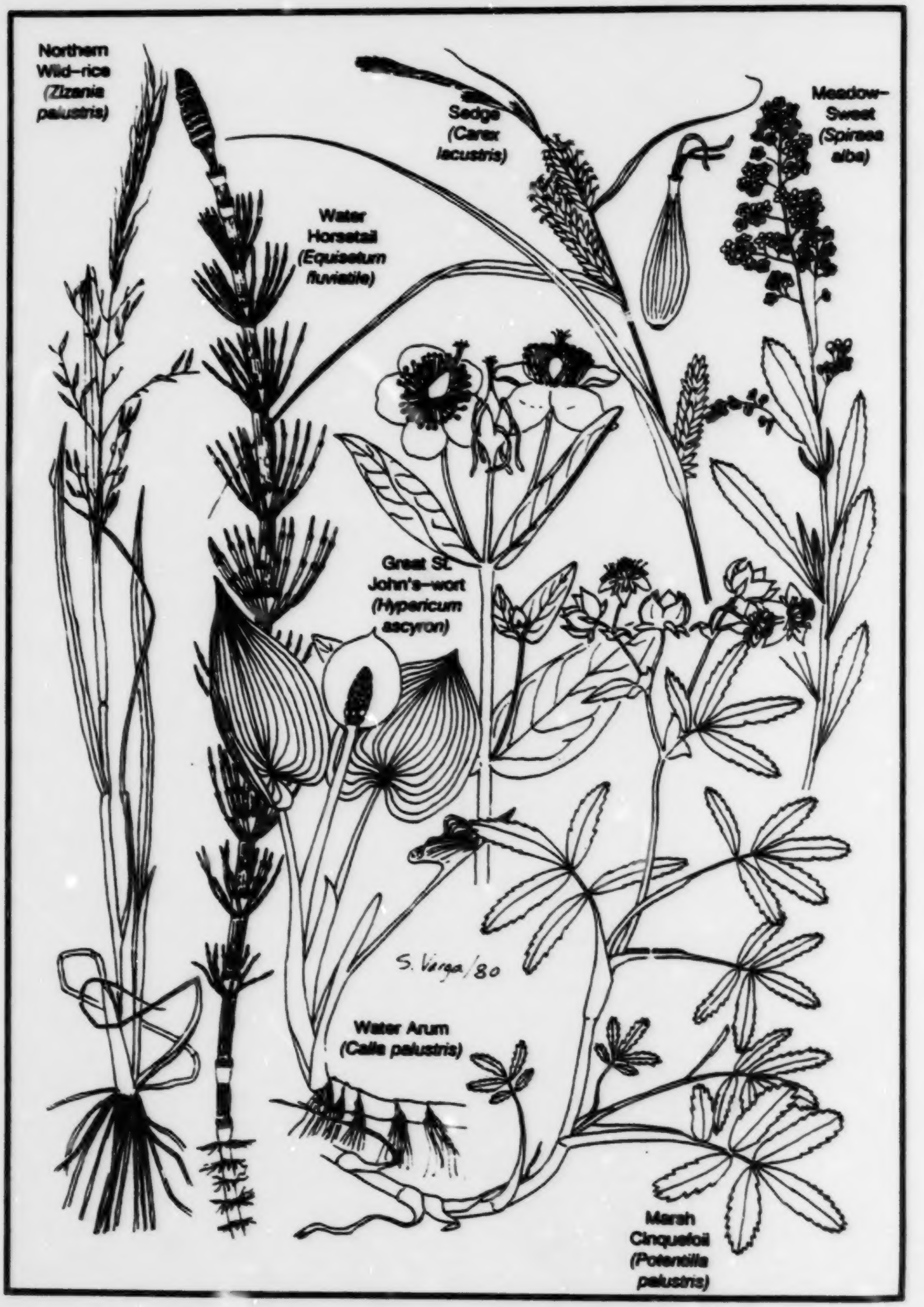

Northern Wild-rice (Zizania palustris)
Sedge (Carex lacustris)
Meadow-Sweet (Spiraea alba)
Water Horsetail (Equisetum fluviatile)
Great St. John's-wort (Hypericum ascyron)
S. Varga/80
Water Arum (Calla palustris)
Marsh Cinquefoil (Potentilla palustris)

Figure 15. Plants of the Rouge lakefront marsh (CT 2, 3, 4, 5).

b. Canary Reed Grass

Canary Reed Grass (*Phalaris arundinacea*) meadow marsh occurs along the length of the Little Rouge Creek and Rouge River north of Highway 401, along a tributary of the Little Rouge Creek north of the CPR line, and occasionally on cut-off river meanders. It is typically situated on sand and gravel bars and shores, between the exposed gravels and sands of the river edge (CT 27), and the willow thickets (CT 11) of the more stable portions of the shore. The community is subject to flooding during storm events and spring runoff. As a result, Canary Reed Grass stands are constantly shifting, colonizing new river bars as old river bars are eroded away.

Common associates with Canary Reed Grass include: Purple Loosestrife (*Lythrum salicaria*), Redtop (*Agrostis gigantea*), goldenrods (*Solidago canadensis, S. altissima*), Joe-pye-weed (*Eupatorium maculatum*), Groundnut (*Apios americana*), Creeping Bent Grass (*Agrostis stolonifera*), Spotted Jewelweed (*Impatiens capensis*), Kentucky Blue Grass (*Poa pratensis*), Thimbleweed (*Anemone canadensis*) and White Sweet Clover (*Melilotus alba*).

Significant species: the regionally rare Angelica (*Angelica atropurpurea*).

c. Variegated Horsetail
d. Scouring Rush

Variegated Horsetail (*Equisetum variegatum*) meadow marsh occurs along river shores, spring-fed bottomland terraces, and on former gravel extraction sites. They are concentrated along the Little Rouge Creek from Tywn Rivers Drive north to the CPR line. Small examples also occur along the Rouge River just west of the Metro Toronto Zoo, and on two abandoned tableland gravel pits southeast of Reesor Road and Steeles Avenue, and northwest of Sheppard Avenue and Meadowvale Road. Variegated Horsetail meadow marsh was once common along Morningside Creek, but most of it has been lost through erosion caused by increased stormwater flows in the creek in the 1980s.

The horsetail meadows grow on calcareous, gravelly substrates, with water at or near the surface. The soils are kept moist by springs or by the river. More than half of these communities are on river sites which were mined for gravel in the late 1950s. Wherever calcareous gravels were extracted below or near the water table, rich Variegated Horsetail meadow marsh has developed. Their species assemblage is very similar to those that occur naturally on spring-fed bottomlands or river shores.

On river shores, Variegated Horsetail is often associated with Canary Reed Grass (*Phalaris arundinacea*). Common associates on the spring-fed bottomland terraces and abandoned gravel extraction sites include panic grass (*Panicum implicatum*), and on the drier edges and on the wetter portions, Scouring Rush (*Equisetum hyemale*). Other common species include: a sedge (*Carex aurea*), rushes (*Juncus dudleyi, J. articulatus*), a water-horehound (*Lycopus americanus*) and Joe-pye-weed (*Eupatorium maculatum*). Tree seedlings and saplings of White Cedar (*Thuja occidentalis*) and White Birch (*Betula papyrifera*) are also common.

On a wet, disturbed field, one example of a Scouring Rush (*Equisetum hyemale*) meadow marsh has developed along a tributary of Little Rouge Creek.

Significant species: the Variegated horsetail meadow marshes (CT 5c) support the locally rare willow-herb (*Epilobium leptophyllum*); and eight regionally rare species including: Fringed Gentian (*Gentiana crinita*), Closed Gentian (*Gentiana andrewsii*), an aster (*Aster pilosus* var. *pilosus*), sedges (*Carex viridula, C. flava*), rush (*Juncus balticus*), Slender Gerardia (*Agalinus tenuifolia*), and Shining Ladies'-tresses (*Spiranthes lucida*).

- e. **Cutgrass ephemeral pond**
- f. **Spotted Jewelweed ephemeral pond and riverine**
- g. **Field Horsetail - Spotted Jewelweed seepage slope**

These meadow marshes occur throughout the park in ephemeral ponds, along intermittent streams, cut-off river meanders and on seepage slopes. In ephemeral ponds, Cutgrass (*Leersia oryzoides*), Spotted Jewelweed (*Impatiens capensis*) and occasionally False Nettle (*Boehmeria cylindrica*) are the major species. Common secondary associates include: a sedge (*Carex hystericina*), Devil's Beggarticks (*Bidens frondosa*), Wool-rush (*Scirpus cyperinus*), Marsh Fern (*Thelypteris palustris*), Fowl Meadow Grass (*Glyceria striata*), Eastern Manna Grass (*Glyceria septentrionalis*), Water Plantain (*Alisma plantago-aquatica*), Water-parsnip (*Sium sauve*) and clearweed (*Pilea pumila*).

Along intermittent streams and cut-off river meanders, Spotted Jewelweed (*Impatiens capensis*) forms dense colonies, with Fowl Manna Grass (*Glyceria striata*) and Field Horsetail (*Equisetum arvense*) important secondary species. Ostrich Fern (*Matteuccia struthiopteris*) can be common on cut-off river meanders.

On open seepage slopes, Field Horsetail is the dominant species, with Spotted Jewelweed often an important secondary associate. Other prevalent species include: Bulblet Fern (*Cystopteris bulbifera*), Virginia creeper (*Parthenocissus inserta*), Fowl Manna Grass (*Glyceria striata*), and a sedge (*Carex scabrata*). There is a scattered shrub layer of Mountain Maple (*Acer spicatum*) and Red-osier Dogwood (*Cornus stolonifera*), and the occasional tree and sapling of White Cedar (*Thuja occidentalis*), White Birch (*Betula papyrifera*) and Basswood (*Tilia americana*).

Significant species: the locally rare Winterberry (*Ilex verticillata*); and seven regionally rare species: Baltic Rush (*Juncus balticus*), a sedge (*Carex laevivaginata*), Eastern Manna Grass (*Glyceria septentrionalis*), a clearweed (*Pilea fontana*), Spring Cress (*Cardamine bulbosa*), Spotted St. John's-wort (*Hypericum punctatum*), and Angelica (*Angelica atropurpurea*).

- h. **Water Arum - Marsh Cinquefoil - Arrowhead cutoff river meander**

This meadow marsh type is known from a cut-off river meander on the east side of the Rouge River just south of Highway 401. It is associated with a thicket swamp (CT 6b). Flooded in the spring, the muck soils are exposed by late summer. They support a lush community of Water Arum (*Calla palustris*), Marsh Cinquefoil (*Potentilla palustris*) and arrowhead (*Sagittaria cuneata*). Duckweed (*Lemna minor*) forms a dense mat on the water surface.

Significant species: the provincially and nationally rare Small Beggar-ticks (*Bidens discoidea*); three regionally rare species: an arrowhead (*Saggitaria cuneata*), a clearweed (*Pilea fontana*), Swamp Rose (*Rosa palustris*); and the locally rare bedstraw (*Galium trifidum* var. *trifidum*).

6. **Thicket Swamp**
   - a. **Speckled Alder**
   - b. **Speckled Alder - Heartleaf Willow - Bog Willow**
   - c. **Red-osier Dogwood**
   - d. **Heartleaf Willow - Sandbar Willow**

The Red-osier Dogwood (*Cornus stolonifera*) and willow thicket swamps (CT 6c, 6d) occur in small stands throughout the park along intermittent streams, spring-fed bottomlands and back portions of the lakefront marsh. The Speckled Alder (*Alnus rugosa*) thicket swamps, however, occur only on the margins of the lakefront marsh (CT 6a), and in a nearby cut-off river meander on the east side of the Rouge River south of Highway 401 (CT 6b).

The Speckled Alder thicket swamps of the lakefront marsh (CT 6a) often have Heartleaf Willow (*Salix eriocephala*) and Red-osier Dogwood as associates. Common in the understorey are Canada Blue-joint (*Calamagrostis canadensis*), sedges (*Carex lacustris, C. stricta*) and Broad-leaved Cattail (*Typha latifolia*).

The Speckled Alder thicket swamp in the cut-off river meander (CT 6b) is associated with Heartleaf Willow and a northern species, the Bog Willow (*Salix pedicellaris*). These shrubs occur on hummocks with understorey species such as Canada Blue-joint, a water horehound (*Lycopus uniflorus*), and a willow-herb (*Epilobium ciliatum*). Between hummocks, exposed muck soils support beds of Water Arum (*Calla palustris*), Marsh Cinquefoil (*Potentilla palustris*), an arrowhead (*Sagittaria cuneata*) and Duckweed (*Lemna minor*).

The dogwood and willow thicket swamps (CT 6c and 6d) have a shrub layer of Red-osier Dogwood, Heartleaf Willow, Sandbar Willow (*Salix exigua*), and occasionally Bebb's Willow (*Salix bebbiana*). Common in the understorey are Canada Blue-joint, Spotted Jewelweed (*Impatiens capensis*), Field Horsetail (*Equisetum arvense*), cattails (*Typha latifolia, T. angustifolia*), a sedge (*Carex lacustris*) and False Nettle (*Boehmeria cylindrica*).

Significant species: the Speckled Alder thicket swamp (CT 6b) supports the provincially and nationally rare Small Beggar-ticks (*Bidens discoidea*); three regionally rare species: an arrowhead (*Saggitaria cuneata*), Swamp Rose (*Rosa palustris*) and a clearweed (*Pilea fontana*); and the locally rare Bog Willow (*Salix pedicellaris*).

7. Deciduous Swamp

- **a. Silver Maple**
- **b. Green Ash - White Ash**
- **c. Bur Oak - Green Ash**
- **d. Crack Willow**
- **e. White Elm**
- **f. Black Ash**
- **g. Beech - White Ash - Blue-beech**
- **h. Red Maple**
- **i. Successional Balsam Poplar**
- **j. Successional Trembling Aspen**

Deciduous swamps in the park are largely found on tablelands with perched water tables, particularly the woodlots between Sewells and Reesor Roads, and southeast of Little Rouge Creek valley and the Beare Road landfill. These tableland swamps contain forests of Silver Maple (*Acer saccharinum*) (CT 7a) on the wettest sites. Sensitive Fern (*Onoclea sensibilis*) is the major species in the understorey, with such common associates as Ostrich Fern (*Matteuccia struthiopteris*), Fowl Manna Grass (*Glyceria striata*), Field Horsetail (*Equisetum arvense*) and Spotted Jewelweed (*Impatiens capensis*).

Wet to wet mesic sites support the park's most common swamp community, an admixture of White Ash (*Fraxinus americana*), Green Ash and Red Ash (*Fraxinus pennsylvanica*) (CT 7b). Occasional, wet young forests are dominated by Black Ash (*Fraxinus nigra*) (CT 7f), or by White Elm (*Ulmus americana*) (CT 7e), with ash species as important co-dominants. Prevalent in the understorey on wetter sites are Sensitive Fern, with such secondary associates as Marsh Marigold (*Caltha palustris*), Field Horsetail (*Equisetum arvense*), Fowl Manna Grass (*Glyceria striata*), Spotted Jewelweed and Ostrich Fern (*Matteuccia struthiopteris*). On more mesic soils, Virginia Waterleaf (*Hydrophyllum virginianum*) is also common.

Young wet mesic ash swamps (CT 7b) and successional swamps of Trembling Aspen (*Populus tremuloides*) - Green Ash (CT 7j) and Balsam Poplar (*Populus balsamifera*) (CT 7i) are common on tablelands clearcut in the 1930s and on pastures abandoned in the 1940s. Important secondary tree species include White Birch (*Betula papyrifera*), White Elm and Black Ash. Common in the understorey are Virgina Creeper (*Parthenocissus inserta*), Riverbank Grape (*Vitis riparia*), Poison-ivy (*Rhus radicans*), Fringed Loosestrife (*Lysimachia ciliata*) and Spotted Jewelweed. One stand of Balsam Poplar swamp also has a dense shrub layer of Red-osier Dogwood (*Cornus stolonifera*).

Wet mesic sites, transistional between swamp and forest, support stands of Bur Oak (*Quercus macrocarpa*) - Green Ash - White Ash - White Elm (CT 7c), Beech - White Ash - Blue-beech (*Carpinus caroliniana*) - Black Maple (*Acer nigrum*) - Sugar Maple (*Acer saccharum*) (CT 7i), and Red Maple (*Acer rubrum*) - White Ash - White Elm - Red Oak (*Quercus rubra*) - Trembling Aspen (CT 7h). Common in the understorey of the first two stands are Virginia Waterleaf. The Red Maple swamp supports an understorey of Poison-ivy, Early Meadow-rue (*Thalictrum dioicum*) and Sensitive Fern.

Deciduous swamps also occur in the bottomlands, along the margins of the lakefront marsh and in old river meanders. These swamps contain large trees of the introduced willow (*Salix Xrubens*), with the occasional small tree of Manitoba Maple (*Acer negundo*). Prevalent in the understorey are Canada Blue-joint (*Calamagrostis canadensis*) along the lakefront marsh stands, and elsewhere Spotted Jewelweed. One young swamp of White Willow (*Salix alba*) has a dense shrub layer of Red-osier Dogwood.

Significant species: deciduous swamp types 7a,b,c,f and g, have six regionally rare species: sedges (*Carex hitchcockiana, C. digitalis, C. tuckermanii*), Moonseed (*Menispermum canadense*), Climbing Poison-ivy (*Rhus radicans* ssp. *radicans*) and Spring Cress (*Cardamine bulbosa*); and the locally rare sedges (*Carex hirtifolia, C. sprengelii*).

8. Mixed Swamp: White Cedar - Hemlock - Yellow Birch

Mixed swamps are rare in the park, confined to spring-fed bottomlands (5 stands in the Rouge River valley, and 3 stands in the Little Rouge Creek valley), and to a tableland with perched water table southeast of Little Rouge Creek and the Beare Landfill.

White cedar (*Thuja occidentalis*) is the major species in the tree layer, often with Hemlock (*Tsuga canadensis*) a co-dominant or rarely a dominant. Important secondary trees include: Yellow Birch (*Betula alleghaniensis*), White Ash (*Fraxinus americana*), and White Elm (*Ulmus americana*). There are scattered shrubs of Mountain Maple (*Acer spicatum*), Red-osier Dogwood (*Cornus stolonifera*) and Alternate-leaved Dogwood (*Cornus alternifolia*).

Common herbs include: Spotted Jewelweed (*Impatiens capensis*), Bulblet Fern (*Cystopteris bulbifera*), Sensitive Fern (*Onoclea sensibilis*), a sedge (*Carex scabrata*), Yellow Jewelweed (*Impatiens pallida*), Ostrich Fern (*Matteuccia struthiopteris*), and Dwarf Raspberry (*Rubus pubescens*).

A number of northern species in the park are largely restricted to this habitat and to the mixed seepage slope forests (CT 10). They include a sedge (*Carex disperma*), Crested Woodfern (*Dryopteris cristata*), Goldthread (*Coptis trifolia*), Swamp Red Currant (*Ribes triste*), Naked Mitrewort (*Mitella nuda*), and Smooth White Violet (*Viola pallens*).

Significant species: the locally rare Balsam Fir (*Abies balsamea*).

9. Seepage Slope Thicket: Mountain Maple

Seepage slope thickets are rare in the park, confined to five small seeps on interfluvial valley slopes of the Rouge River, and one on the east side of Little Rouge Creek just north of Highway 401. The soils are kept perpetually wet by water seeping from underground aquifers.

Mountain Maple (*Acer spicatum*) forms a shrub layer, with an understorey of Spotted Jewelweed (*Impatiens capensis*), Bulblet Fern (*Cystopteris bulbifera*), and Field Horsetail (*Equisetum arvense*). There are scattered saplings and tree seedlings of Yellow Birch (*Betula alleghaniensis*), Basswood (*Tilia americana*), White Cedar (*Thuja occidentalis*), Sugar Maple (*Acer saccharum*), White Birch (*Betula papyrifera*), and Hemlock (*Tsuga canadensis*).

10. Seepage Slope Mixed and Conifer Forest: White Cedar

Mixed and Conifer Forests on seepage slopes are rare in the park, with four small stands in the Little Rouge Creek valley and six stands in the Rouge River valley. The two largest stands occur on the west side of the Rouge River between Highway 401 and Tywn Rivers Drive, and on the west side of the Rouge River just south of Steeles Avenue.

White Cedar (*Thuja occidentalis*) generally dominates in the tree layer, with Hemlock (*Tsuga canadensis*) and Yellow Birch (*Betula alleghaniensis*) common secondary species and occasional co-dominants.

The constantly moist soils support scattered shrubs of Mountain Maple (*Acer spicatum*), and a lush herbaceous layer of Bulblet Fern (*Cystopteris bulbifera*), Field Horsetail (*Equisetum arvense*) and Spotted Jewelweed (*Impatiens capensis*). Occasional drier pockets sustain Bulblet Fern, woodferns (*Dryopteris intermedia, D. carthusiana*) and Enchanter's Nightshade (*Circaea lutetiana*).

Significant species: the regionally rare clearweed (*Pilea fontana*) and a sedge (*Carex laevivaginata*).

TERRESTIAL COMMUNITY TYPES

Terrestial communities are the most common vegetation types, covering 29% of the Rouge Valley Park. They are grouped under four physiographic headings.

- **Primary** (1% of the park); primary substrates are maintained in early successional states by natural disturbances, for example, river bars and bluffs along the rivers and lakeshore.

- **Bottomlands** (9% of the park); including the active floodplains of the Little Rouge Creek and the Rouge River.

- **Valley slopes** (11% of the park).

- **Tablelands and high valley terraces** (8% of the park); including the uplands between and to either side of the two river valleys, and the old terraces in the valleys, now perched above the present floodplain.

The last three physiographic units are further subdivided by life forms (deciduous, mixed, conifer) and by soil moisture (dry, dry mesic, mesic).

BOTTOMLANDS

11. Bottomland Thicket: Sandbar Willow - Heartleaf Willow

Willow thickets are common along the length of the Little Rouge Creek and the Rouge River north of Highway 401. They form on the more stable portion of gravel and sand river bars, and on low floodplain terraces that experience frequent flooding.

Sandbar Willow (*Salix exigua*) and Heartleaf Willow (*Salix eriocephala*) comprise the shrub layer. On more stable sites, saplings of Manitoba Maple (*Acer negundo*), Balsam Poplar (*Populus balsamifera*) and the introduced willow (*Salix Xrubens*) are common. Prevalent in the understorey are Reed Canary Grass (*Phalaris arundinacea*), Canada Goldenrod (*Solidago canadensis*), Field Horsetail (*Equisetum arvense*), and to a lesser extent Riverbank Grape (*Vitis riparia*), Coltsfoot (*Tussilago farfara*), Groundnut (*Apios americana*) and Kentucky Blue grass (*Poa pratensis*).

Significant species: the regionally rare Riverbank Wild Rye (*Elymus riparius*) and Angelica (*Angelica atropurpurea*).

12. Deciduous Bottomland Forest

Lower Bottomland Terrace

- **a. Crack Willow - Manitoba Maple**
- **b. Manitoba Maple**
- **c. Balsam Poplar - Manitoba Maple - Crack Willow**
- **d. White Ash - Manitoba Maple**
- **g. Disturbed: European Alder**

The extensive deciduous forests on the lower bottomland terraces are situated one to three meters above the level of the Rouge River and Little Rouge Creek. The soils consist of fine silts, periodically laid down by floods, largely during spring runoff and severe summer storm events. In the two forest stands sampled quantitatively, soil profiles consist of one to two layers of A Horizon (up to 7 cm thick) sandwiched between silts deposited during severe floods. They are characterized by relatively poor water retaining capacity, low organic content, and a high pH of 7.8 (Varga 1984; R11 and R14 on Table 3).

These bottomland terraces have been significantly altered by humans. By the mid-1800s most of the bottomlands had been cleared for pastures and crops. The cultivated lands were largely abandoned in the early to mid-1900s, particularly after the devastating flood after Hurricane Hazel in 1954. These lands quickly revegetated to forests consisting largely of introduced tree species with a native understorey.

The presettlement forest composition of the bottomlands is unknown. There are no historical descriptions in the Ontario Land Surveys. Presumably, the forests would have consisted of the native species adapted to floodplains which continue to reside in the park; such as the willows (*Salix amygdaloides, S. nigra, S. petiolaris*), White Ash (*Fraxinus americana*), White Elm (*Ulmus americana*), Balsam Poplar (*Populus balsamifera*), Eastern Cottonwood (*Populus deltoides*), Black Walnut (*Juglans nigra*) and Sycamore (*Platanus occidentalis*).

Today, older stands on the bottomlands are most extensive on the Rouge River south of Highway 401, and along the two valleys north to Twyn Rivers Drive. They support an admixture of the introduced willow (*Salix Xrubens*) and the possibly introduced Manitoba Maple (*Acer negundo*) (CT 12a, 12b). (Manitoba Maple, native to floodplains in the mid-West has apparently been introduced to the Rouge watershed. This finding is supported by the lack of early collections for Manitoba Maple in the Toronto region, and an early checklist for the region (Scott 1913) which notes that Manitoba Maple is a planted introduction.) Common secondary tree species consist of Balsam Poplar, White Elm, White Ash and Eastern Cottonwood. In a few stands, generally on slightly higher terraces, White Ash can dominate, with Manitoba Maple a secondary tree species (CT 12d).

The silty, periodically flooded soils are an ideal habitat for Ostrich Fern (*Matteuccia struthiopteris*). It forms a lush layer up to 2 m high. Minor associates in the understorey include; Starry False Solomon's-seal (*Smilacina stellata*), Tall Meadow-rue (*Thalictrum pubescens*), Spotted Jewelweed (*Impatiens capensis*), Enchanter's Nightshade (*Circaea lutetiana*), Sensitive Fern (*Onoclea sensibilis*), Virginia Creeper (*Parthenocissus inserta*) and Riverbank Grape (*Vitis riparia*).

Younger forests are most common in the river valleys upstream of Twyn Rivers Drive. These forests have Balsam Poplar as the major tree species, with Manitoba Maple and the introduced willow (*Salix Xrubens*) often sharing dominance (CT 12c). Occasionally, Manitoba Maple will be the most prevalent tree species in young forests (CT 12b). One small terrace sustains an introduced forest of European Alder (*Alnus glutinosa*) (CT 12g).

In these young forests, Ostrich Fern is still common in the understorey. The higher light levels, however, allow other species to become prevalent, including the goldenrods (*Solidago canadensis, S. graminifolia*), Poison-ivy (*Rhus radicans*), Virginia Creeper (*Parthenocissus inserta*), and Riverbank Grape (*Vitis riparia*).

Significant species: six regionally rare species, Riverbank Wild Rye (*Elymus riparius*), Angelica (*Angelica atropurpurea*), White Grass (*Leersia virginica*), a clearweed (*Pilia fontana*), Moonseed (*Menispermum canadense*), Climbing Poison-ivy (*Rhus radicans* ssp. *radicans*); and the locally rare sedge (*Carex hirtifolia*).

Bottomland Mid-Terrace

- **e. Black Maple - Sugar Maple**
- **f. White Ash - Sugar Maple**

Higher bottomland terraces, in the upper half of the park, support forests of Black Maple (*Acer nigrum*) - Sugar Maple (*Acer saccharum*) (CT 12e), and forests of White Ash (*Fraxinus americana*) - Sugar Maple (CT 12f). They are situated on terraces, generally about 1-2 m above the lower terraces of Manitoba Maple (*Acer negundo*), consequently they are flooded less frequently. A soil profile for one quantitatively sampled stand consists of a 22 cm thick A Horizon, characterized by good water retaining capacity, high organic content and a high pH of 7.8 (Varga 1984; R10 on Table 3).

Black Maple terraces occur in ten stands on the Rouge River north of Twyn Rivers Drive, with the majority concentrated around Finch Avenue. The White Ash terraces occur in one stand along an old meander of the Rouge River, just south of the Cedarbrae Golf Course. Both mid-terrace forest types also occur in sizeable stands on Little Rouge Creek, just south of Steeles Avenue.

Prominent in the understorey is a dense layer of Ostrich Fern (*Matteuccia struthiopteris*), Bulblet Fern (*Cystopteris bulbifera*), and Blue Cohosh (*Caulophyllum thalictroides*). Other common associates include Zig-zag Goldenrod (*Solidago flexicaulis*), Wild Ginger (*Asarum canadense*), Virginia Creeper (*Parthenocissus inserta*), Enchanter's Nightshade (*Circaea lutetiana*) and Yellow Jewelweed (*Impatiens pallida*).

Significant species: the regionally rare Mountain-rice (*Oryzopsis racemosa*), Black Walnut (*Juglans nigra*), a sedge (*Carex amphibola*), and the locally rare sedge (*Carex hirtifolia*).

13. Mixed Bottomland Forest

Lower Bottomland Terrace

- **a. White Cedar - Manitoba Maple**

Occasionally, the lower terraces have mixed forests of White Cedar (*Thuja occidentalis*) and Manitoba Maple (*Acer negundo*) among the predominant deciduous bottomland forests. These stands are concentrated on the Rouge River and Little Rouge Creek, just south and north of Twyn Rivers Drive. Smaller clusters also occur on the Little Rouge Creek north of the Beare landfill access road, on the Rouge River just west of Meadowvale Road, and on the Rouge River south of Steeles Avenue.

Other common tree species in these mixed bottomlands include the introduced willow (*Salix Xrubens*), White Ash (*Fraxinus americana*), White Elm (*Ulmus americana*), and Balsam Poplar (*Populus balsamifera*). The proliferation of the fast growing Manitoba Maple has impacted negatively on some of the mixed stands, shading out and killing slower growing White Cedars.

The infrequently flooded, rich silty, calcareous soils sustain a lush ground cover of Ostrich Fern (*Matteuccia struthiopteris*) and Bulblet Fern (*Cystopteris bulbifera*) (R13 in Table 3). Other common understorey species include: Spotted Jewelweed (*Impatiens capensis*), Wood Nettle (*Laportea canadensis*), Zig-zag Goldenrod (*Solidago flexicaulis*), White Snakeroot (*Eupatorium rugosum*), and Enchanter's Nightshade (*Circaea lutetiana*).

Significant species: the regionally rare Canada Brome (*Bromus pubescens*), Climbing Poison-ivy (*Rhus radicans* ssp. *radicans*), White Grass (*Leersia virginica*), Riverbank Wild Rye (*Elymus riparius*), Canada Waterleaf (*Hydrophyllum canadense*) and Sycamore (*Platanus occidentalis*).

Bottomland Mid-Terrace

13. b. White Cedar - Hemlock - Hardwood
c. White Cedar - Black Maple - Sugar Maple
d. White Cedar - Hardwood
14. Conifer Bottomland Forest: White Cedar

Higher terraces, a further 1-2 m above the lower bottomland terraces of Manitoba Maple and Balsam Poplar, occasionally support mixed or conifer forests dominated by White Cedar (*Thuja occidentalis*).

These higher terraces occur along the Rouge River and Little Rouge Creek around Twyn Rivers Drive, along the Rouge River around Meadowvale Road, Finch Avenue and the CPR line, and on Little Rouge east of Finch Avenue and Meadowvale Road.

In some stands (CT 14), White Cedar is the only major tree species, with a few stems of White Birch (*Betula papyrifera*), White Ash (*Fraxinus americana*) and Basswood (*Tilia americana*). Most stands are mixed forests, however, where White Cedar shares dominance with Hemlock (*Tsuga canadensis*) (CT 13b), with Sugar Maple (*Acer saccharum*) and White Ash (*Fraxinus americana*) (CT 13d); and with Black Maple (*Acer nigrum*) and Sugar Maple (CT 13c). Minor tree species include Basswood (*Tilia americana*), Ironwood (*Ostrya virginiana*), and Balsam Poplar (*Populus balsamifera*).

The understorey supports a rich assemblage of Bulblet Fern (*Cystopteris bulbifera*) and Ostrich Fern (*Matteuccia struthiopteris*), with such common associates as Blue Cohosh (*Caulophyllum thalictroides*), Wild Ginger (*Asarum canadense*), Enchanter's Nightshade (*Circaea lutetiana*), Zig-zag Goldenrod (*Solidago flexicaulis*), jewelweeds (*Impatiens capensis*, *I. pallida*), Wood Nettle (*Laportea canadensis*), White Snakeroot (*Eupatorium rugosum*), Poison-ivy (*Rhus radicans*), Jack-in-the-Pulpit (*Arisaema triphyllum*), Lopseed (*Phryma leptostachya*) and Virginia Creeper (*Parthenocissus inserta*).

Significant species: the provincially threatened American Ginseng (*Panax quinquefolius*); five regionally rare species, a sedge (*Carex amphibola*), Black Walnut (*Juglans nigra*), Sycamore (*Platanus occidentalis*), Canada Brome (*Bromus pubescens*), a mountain-rice (*Oryzopsis racemosa*); and the locally rare Great-spurred Violet (*Viola selkirkii*).

VALLEY SLOPES

15. Dry to Dry Mesic Deciduous and Mixed Valley Slope Forest

- **a. Red Oak - White Oak**
- **b. Red Oak - White Oak - White Pine**
- **c. Red Oak - White Birch**

The driest southfacing slopes of the lower Rouge support forests of Red Oak (*Quercus rubra*), with White Oak (*Quercus alba*) and, occasionally, White Pine (*Pinus strobus*), Red Maple (*Acer rubrum*) and Sugar Maple (*Acer saccharum*) as important secondary or co-dominant trees (CT 15a, 15b). Sugar Maple is more prevalent on the dry mesic sites. A few younger stands support forests of Red Oak, with White Birch (*Betula papyrifera*) an important secondary species (CT 15c). These oak forests are common in the valleys south of Twyn Rivers Drive, largely on upper slopes with clay loam or sandy loam soils. The soil pH varies from basic to slightly acidic (pH 6.9 to 7.8) on the clay loam soils (Varga 1984, Crins 1985), and from neutral to moderately acidic on the sandy loams (R3 in Table 3). The acidic character of some of the soils is due to the acidity of oak leaf humus (Curtis 1959).

Under the relatively open oak canopy of the drier sites, there is a dense tall shrub layer of Rough-leaved Dogwood (*Cornus rugosa*) and Witch-hazel (*Hamamelis virginiana*). Other common tall shrubs include hawthorns (*Crataegus pedicellata, C. succulenta* var. *macracantha*), Nannyberry (*Viburnum lentago*) and Serviceberry (*Amelanchier arborea, A. sanguinea, A. spicata*). Below these is a scattered low to medium shrub layer of Bush-honeysuckle (*Diervilla lonicera*), Snowberry (*Symphoricarpos albus*) and Chokecherry (*Prunus virginiana*).

Common herbs in the understorey include Bracken Fern (*Pteridium aquilinum*), a sedge (*Carex pensylvanica*), Wild Sarsaparilla (*Aralia nudicaulis*), Large-leaved Aster (*Aster macrophyllus*), Blue-stem Goldenrod (*Solidago caesia*), a tick-trefoil (*Desmodium glutinosum*), Wild Cranesbill (*Geranium maculatum*), Poison-ivy (*Rhus radicans*), Enchanter's Nightshade (*Circaea lutetiana*), and Starry False Solomon's-seal (*Smilacina stellata*). On dry mesic sites, Early Meadow-rue (*Thalictrum dioicum*) and False Solomon's Seal (*Smilacina racemosa*) are also prominent.

Significant species: the provincially and nationally rare Shy Bulrush (*Scirpus verecundus*); sixteen regionally rare species including: Pale Vetchling (*Lathyrus ochroleucus*), Robin's-plantain (*Erigeron pulchellus*), Riverbank Wild Rye (*Elymus riparius*), Hairy Beard-tongue (*Penstemon hirsutus*), Wire-stemmed Muhly Grass (*Muhlenbergia frondosa*), Canada Brome (*Bromus pubescens*), Bearded Shorthusk (*Brachyelytrum erectum*), a wood rush (*Luzula multiflora*), a sedge (*Carex cephalophora*), panic grasses (*Panicum latifolium, P. xanthophysum*), Sicklepod (*Arabis canadensis*), Poke milkweed (*Asclepias exaltata*), Yellow pimpernel (*Taenidia integerrima*), a mountain-rice (*Oryzopsis racemosa*), Early Sweet Blueberry (*Vaccinium pallidum*); and the locally rare Hairy Goldenrod (*Solidago hispida*) and Lowbush Blueberry (*Vaccinium angustifolium*).

16. Dry Mesic Deciduous Valley Slope Forest

- **a. Red Oak - Sugar Maple**
- **b. Red Oak - White Birch**
- **c. Red Oak**

The slopes which are dry mesic, and south, west or eastfacing, sustain forests of Red Oak (*Quercus rubra*) (CT 16c), and forests of Red Oak with Sugar Maple (*Acer saccharum*), with Beech (*Fagus grandifolia*) as an important secondary tree species (CT 16a). On younger sites, Red Oak occurs with White Birch (*Betula papyrifera*) (CT 16b). Minor tree species include White Pine (*Pinus strobus*), Red Maple (*Acer rubrum*), Black Cherry (*Prunus serotina*), White Ash (*Fraxinus americana*), White Birch (*Betula papyrifera*), and Ironwood (*Ostrya virginiana*).

Figure 16. Oak forest slopes along the east side of the Rouge River south of Hwy. 401 (CT 15) (JLR 1991).

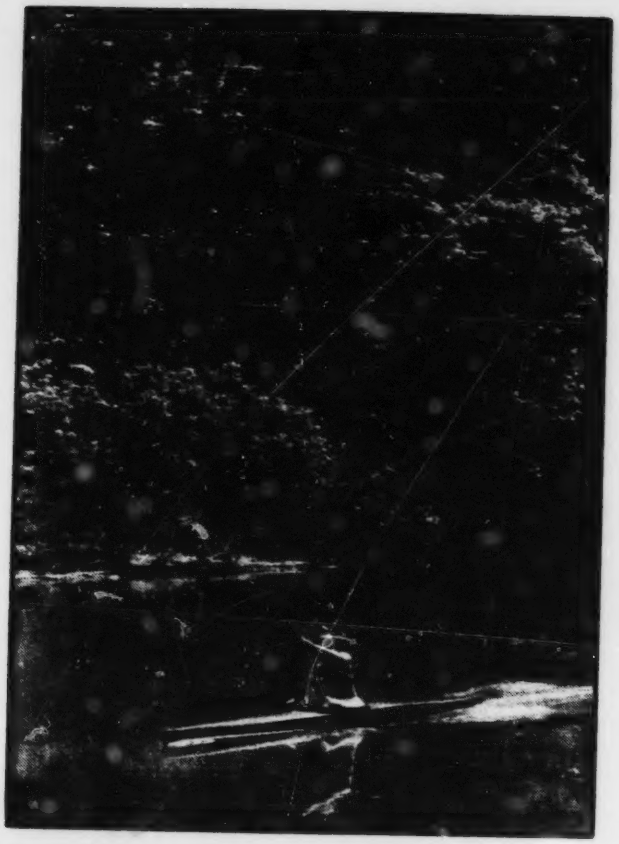


Figure 17. Shy Bulrush (*Scirpus verecundus*), a nationally rare plant on the oak forest slopes of the lower Rouge River (JLR 1980).

The few Red Oak (CT 16c) and Red Oak - White Birch (CT 16b) stands are restricted to steep slopes around the lakefront marsh. In contrast, the more common Red Oak - Sugar Maple forests (CT 16a) occur throughout the Rouge River up to Meadowvale Road and along Little Rouge Creek up to Plug Hat Road. The best stands are found in the river valleys just north of Twyn Rivers Drive.

On the uppermost slopes, particularly on drier southfacing aspects, there is a common tall shrub layer of Rough-leaved Dogwood (*Cornus rugosa*). On all slopes, Chokecherry (*Prunus virginiana*) forms a common to scattered medium shrub layer. Prevalent in the herb layer are Blue-stem Goldenrod (*Solidago caesia*), sedges (*Carex pensylvanica, C. pedunculata*), Early Meadow-rue (*Thalictrum dioicum*), Large-leaved Aster (*Aster macrophyllus*) and, to a lesser extent, May-apple (*Podophyllum peltatum*), a tick-trefoil (*Desmodium glutinosum*), False Solomon's-seal (*Smilacina racemosa*), and Zig-zag Goldenrod (*Solidago flexicaulis*).

Significant species: the following eleven regionally rare species; Sicklepod (*Arabis canadensis*), a panic grass (*Panicum latifolium*), Poke Milkweed (*Asclepias exaltata*), sedges (*Carex cephalophora, C. digitalis*), Canada Brome (*Bromus pubescens*), Wild Licorice (*Galium circaezans*), Thin-leaved Sunflower (*Helianthus decapetalus*), a mountain-rice (*Oryzopsis racemosa*), a wood rush (*Luzula multiflora*) and Yellow Pimpernel (*Taenidia integerrima*). Wild Licorice is restricted to these oak forests.

17. Mesic Deciduous Valley Slope Forest

- **a. Sugar Maple - Black Maple**
- **b. Sugar Maple**
- **c. Sugar Maple - Beech**
- **d. Sugar Maple - White Ash**
- **e. Sugar Maple - White Birch**
- **f. Sugar Maple - Red Oak**

Sugar Maple is the dominant tree of moist slopes of various aspects, particularly the lower slopes. These forests are increasingly common in the river valleys north of Highway 401. South of this highway there are only a few small groves. The soils are loams or clay loams. Two stands sampled quantitatively have loam soils with a basic pH of 7.8 under a rich Sugar Maple - Black Maple stand, and a slightly acidic to neutral pH of 7.2 to 7.5 under a Beech - Sugar Maple stand (R5 and R12 in Table 3). The slightly lower pH of Beech forests is due to the acidity of beech leaf humus.

On slightly drier sites, often on warmer southern aspects, Beech can be a co-dominant with Sugar Maple or even a dominant in the tree layer (CT 17c). Drier sites can also have Red Oak as a secondary tree species (CT 17f). These forests have scattered shrubs of Witch-hazel (*Hamamelis virginiana*), Beaked Hazel (*Corylus cornuta*), Maple-leaved Viburnum (*Viburnum acerifolium*), and Chokecherry (*Prunus virginiana*). Common herbs include Scouring-rush (*Equisetum hyemale* - forms large colonies in several stands), Wild Sarsaparilla (*Aralia nudicaulis*), Blue-stem Goldenrod (*Solidago caesia*), Bracken Fern (*Pteridium aquilinum*), Early Meadow-rue (*Thalictrum dioicum*), False Solomon's-seal (*Smilacina racemosa*), May-apple (*Podophyllum peltatum*), a sedge (*Carex pensylvanica*), and Poison-ivy (*Rhus radicans*). More common in the Beech stands are Zig-zag Goldenrod (*Solidago flexicaulis*), Bloodroot (*Sanguinaria canadensis*), and White Snakeroot (*Eupatorium rugosum*).

Sugar Maple stands are the most common examples of moist deciduous forests on valley slopes. On mature sites, there is only a scattering of other tree species, Beech, Hemlock (*Tsuga canadensis*), White Ash (*Fraxinus americana*), Ironwood (*Ostrya virginiana*), Basswood (*Tilia americana*), Blue-beech (*Carpinus caroliniana*), Black Cherry (*Prunus serotina*), and Bitternut Hickory (*Carya cordiformis*). Only a few scattered shrubs of Alternate-leaved Dogwood (*Cornus alternifolia*) and Red-berried Elder (*Sambucus pubens*) are present under the closed canopy. Spring vernals such as Yellow Trout-lily (*Erythronium americanum*) are common. Other prevalent herbs include Blue Cohosh (*Caulophyllum thalictroides*), Early Meadow-rue, White Trillium (*Trillium*

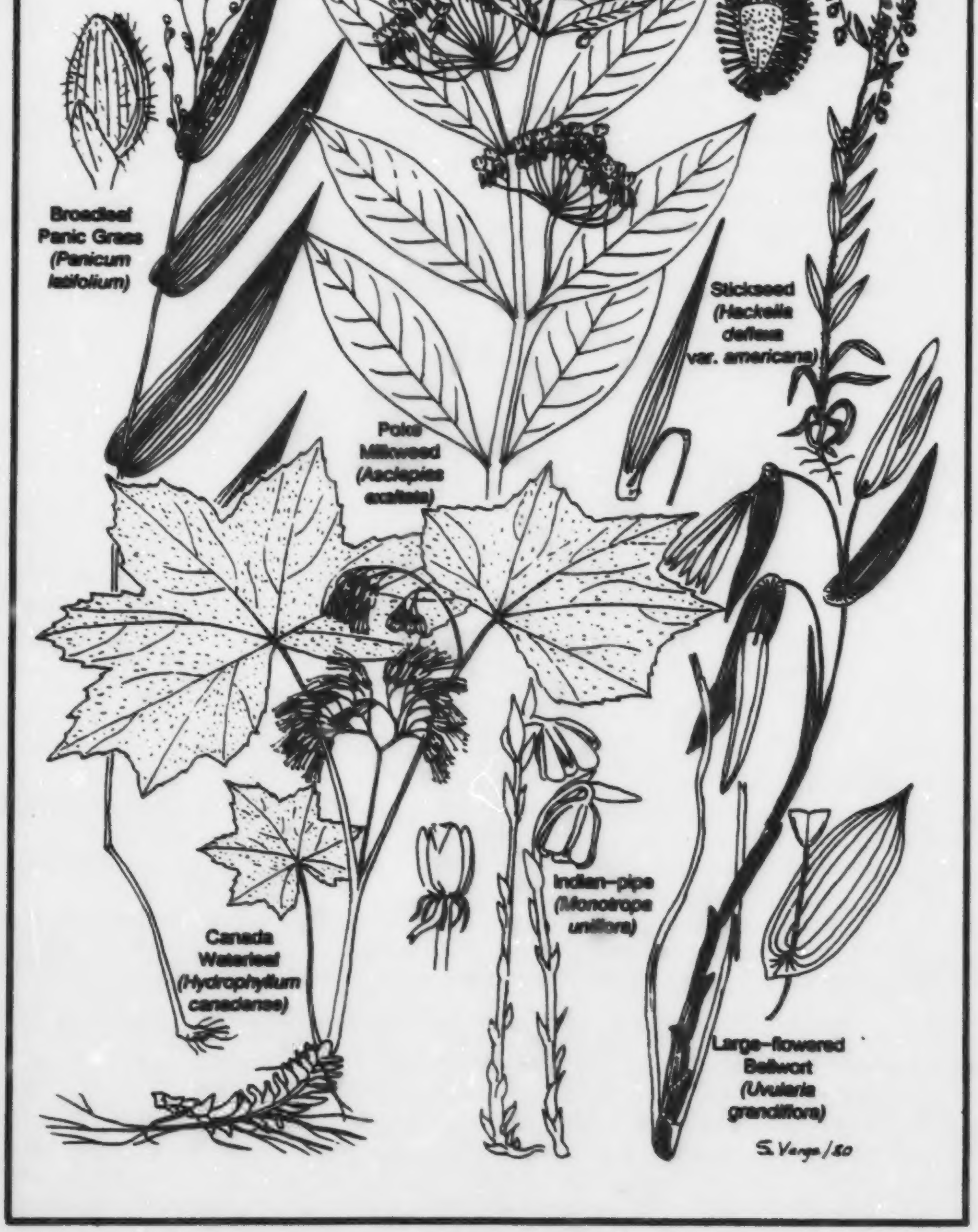

Broadleaf Panic Grass (Panicum latifolium)
Poke Milkweed (Asclepias exaltata)
Stickseed (Hackelia deflexa var. americana)
Indian-pipe (Monotropa uniflora)
Canada Waterleaf (Hydrophyllum canadense)
Large-flowered Bellwort (Uvularia grandiflora)
S. Varga/80

Figure 18. Plants of the dry-to-mesic deciduous forest slopes (CT 15, 16, 17).

grandiflorum), Zig-zag Goldenrod, Enchanter's Nightshade (*Circaea lutetiana*), White Snakeroot, Wild Ginger (*Asarum canadense*), and Virginia Waterleaf (*Hydrophyllum virginianum*).

Several rich slopes on the Rouge River west of the Metro Toronto Zoo have Black Maple (*Acer nigrum*) as an important secondary tree species (CT 17a). Rich understorey species, such as Wild Leek (*Allium tricoccum*) and Canada Waterleaf (*Hydrophyllum canadense*), are common.

Significant species: the provincially threatened American Ginseng (*Panax quinquefolius*); and five regionally rare species, Canada Waterleaf (*Hydrophyllum canadense*), a mountain-rice (*Oryzopsis racemosa*), Canada Brome (*Bromus pubescens*), Sicklepod (*Arabis canadensis*), and Poke Milkweed (*Asclepias exaltata*). Major populations of American Ginseng and the first three regionally rare species are largely confined, in the park, to these moist Sugar Maple and Beech valley slope forests.

18. Dry Mesic Mixed Valley Slope Forests

a. **Hemlock - Red Oak**
b. **White Pine - Hemlock**
c. **White Pine - Red Oak**
d. **White Cedar - Red Oak**

Dry mesic mixed forests on valley slopes are uncommon in the park. They are typically found on northfacing, cool slopes with sandy loams or, rarely, clay loams. The soil profile for a quantitatively sampled White Pine and Hemlock stand consists of a sandy loam with a slightly acidic pH of 7.2 (Riley and Varga 1980; R2 in Table 3).

Mixed forests of Hemlock (*Tsuga canadensis*) and Red Oak (*Quercus rubra*) (CT 18a) are most frequent. Important secondary tree species include White Oak (*Quercus alba*) and White Pine (*Pinus strobus*) on drier sites, and Sugar Maple (*Acer saccharum*) and Beech (*Fagus grandifolia*) on moister sites. Minor tree species consist of Red Maple (*Acer rubrum*), Ironwood (*Ostrya virginiana*), White Birch (*Betula papyrifera*), Black Cherry (*Prunus serotina*), White Cedar (*Thuja occidentalis*) and White Ash (*Fraxinus americana*). Below the canopy, there is a scattered shrub layer of Rough-leaved Dogwood (*Cornus alternifolia*), Witch-hazel (*Hamamelis virginiana*), Chokecherry (*Prunus virginiana*), and Snowberry (*Symphoricarpos albus*). Common herbs include Wild Sarsaparilla (*Aralia nudicaulis*), Blue-stem Goldenrod (*Solidago caesia*), a sedge (*Carex pensylvanica*), Bracken Fern (*Pteridium aquilinum*), False Solomon's-seal (*Smilacina racemosa*), and Large-leaved Aster (*Aster macrophyllus*).

White Pine forests are rare in the park, being restricted to seven small stands. On dry sites, White Pine is co-dominant with Red Oak and White Oak (see CT 15b). On dry mesic sites, Red Oak is the sole co-dominant, with one slightly moister stand sustaining a White Pine - Red Oak - Sugar Maple forest (CT 18c). White Pine attains its highest importance in a mature stand on Morningside Creek, where it is associated with Hemlock (*Tsuga canadensis*) and White Cedar (*Thuja occidentalis*) (CT 18b) (R2 in Table 3). Minor deciduous tree species include: Red Maple, Red Oak and Sugar Maple. Most common in the sparse understorey are Blue-stem Goldenrod, Wild Lily-of-the-valley (*Maianthemum canadense*), Large-leaved Aster, a sedge (*Carex pensylvanica*) and False Solomon's-seal.

In five small stands, White Cedar co-dominates with Red Oak (CT 18d). Sugar Maple and White Pine can also be important tree species. The understorey is similar to those noted in CT 18a. The best mature example of this forest type is located on the east side of Little Rouge Creek, just north of Highway 2.

Significant species: the regionally rare Sicklepod (*Arabis canadensis*), and Robin's Plantain (*Erigeron pulchellus*).

19. Mesic Mixed Valley Slope Forest

a. Hemlock - Sugar Maple
b. Hemlock - Beech - Sugar Maple
c. Hemlock - White Birch
d. White Cedar - Hemlock - hardwood
e. White Cedar - hardwood
g. White Cedar - White Birch

Mesic mixed forests are common on valley slopes with a northfacing, cool aspect, on clay loams or sandy loams. Two stands sampled quantitatively have soil profiles of sandy loam with a highly acidic pH of 5.5 for a hemlock stand, and clay loam with a neutral to slightly acidic pH of 7.2 to 7.5 for a White Cedar stand (R1 and R4 in Table 3). Typically, Hemlock stands have acidic soils. Messenger (1975) has documented the role of organic acids and aluminum liberated from decomposing Hemlock litter in enhancing the rate of depletion of basic cations from surface soils. The acidic soils are also characterized by a relatively thick mor humus layer of up to 3 cm.

Two conifer species, Hemlock (*Tsuga canadensis*) (CT 19a-d) and White Cedar (*Thuja occidentalis*) (CT 19d-g) dominate the tree canopy. Common associates in the mature Hemlock forests are Sugar Maple (*Acer saccharum*) (CT 19a) on rich mesic sites, and Beech (*Fagus grandifolia*), Sugar Maple and occasionally Red Maple (*Acer rubrum*) (CT 19b) on slightly drier sites. The younger hemlock forests have White Birch (*Betula papyrifera*) as an important secondary species (CT 19c). Most of the White Cedar forests occur in combination with Hemlock (CT 19d). Sugar Maple is the most common deciduous tree, with occasional stems of Beech, White Birch, Ironwood (*Ostrya virginiana*), Basswood (*Tilia americana*), and White Ash (*Fraxinus americana*).

Forests where White Cedar is the only major conifer species are less frequent in the park. On mature sites it occurs with Sugar Maple and, to a lesser extent, White Ash and Black Maple (*Acer nigrum* - restricted to several stands along the Rouge River south of Steeles Avenue). On younger sites, White Cedar commonly occurs with White Birch (CT 19f). There is one stand where White Pine is an important secondary tree species (CT 19g).

Under the dense conifer shade, there are only scattered shrubs of Mountain Maple (*Acer spicatum*), Alternate-leaved Dogwood (*Cornus alternifolia*) and Ground Yew (*Taxus canadensis*). Most abundant on the rich sites are a diversity of ferns such as Bulblet Fern (*Cystopteris bulbifera*), wood ferns (*Dryopteris intermedia, D. carthusiana*), Marginal Shield Fern (*Dryopteris marginalis*), Christmas Fern (*Polystichum acrostichoides*), and occasionally Ostrich Fern (*Matteuccia struthiopteris*).

Other common herbs include Blue-stem Goldenrod (*Solidago caesia*), Zig-zag Goldenrod (*Solidago flexicaulis*), Rose-twisted Stalk (*Streptopus roseus*), Wild Lily-of-the-valley (*Maianthemum canadense*), White Trillium (*Trillium grandiflorum*), Jack-in-the-pulpit (*Arisaema triphyllum*), Enchanter's Nightshade (*Circaea lutetiana*), Spotted Jewelweed (*Impatiens capensis*), Herb-robert (*Geranium robertianum*), a Solomon's-seal (*Polygonatum pubescens*), Wild Sarsaparilla (*Aralia nudicaulis*), and Red Baneberry (*Actaea rubra*). On sites where Beech is a strong secondary species, the herbaceous layer tends to be sparse due to the Beech leaf litter and the dense conifer shade.

Significant species: four regionally rare species, including Rock Polypody (*Polypodium virginianum*), Pinesap (*Monotropa hypopithys*), Poke Milkweed (*Asclepias exaltata*), Stickseed (*Hackelia deflexa*); and five locally rare species, Balsam Fir (*Abies balsamea*), Round-branched Ground-pine (*Lycopodium dendroideum*), Crowfoot Clubmoss (*Lycopodium digitatum*), Indian Cucumber-root (*Medeola virginiana*), and Hobblebush (*Viburnum alnifolium*). All but Balsam Fir and Poke Milkweed are largely or entirely restricted to these Hemlock and White Cedar slope forests.

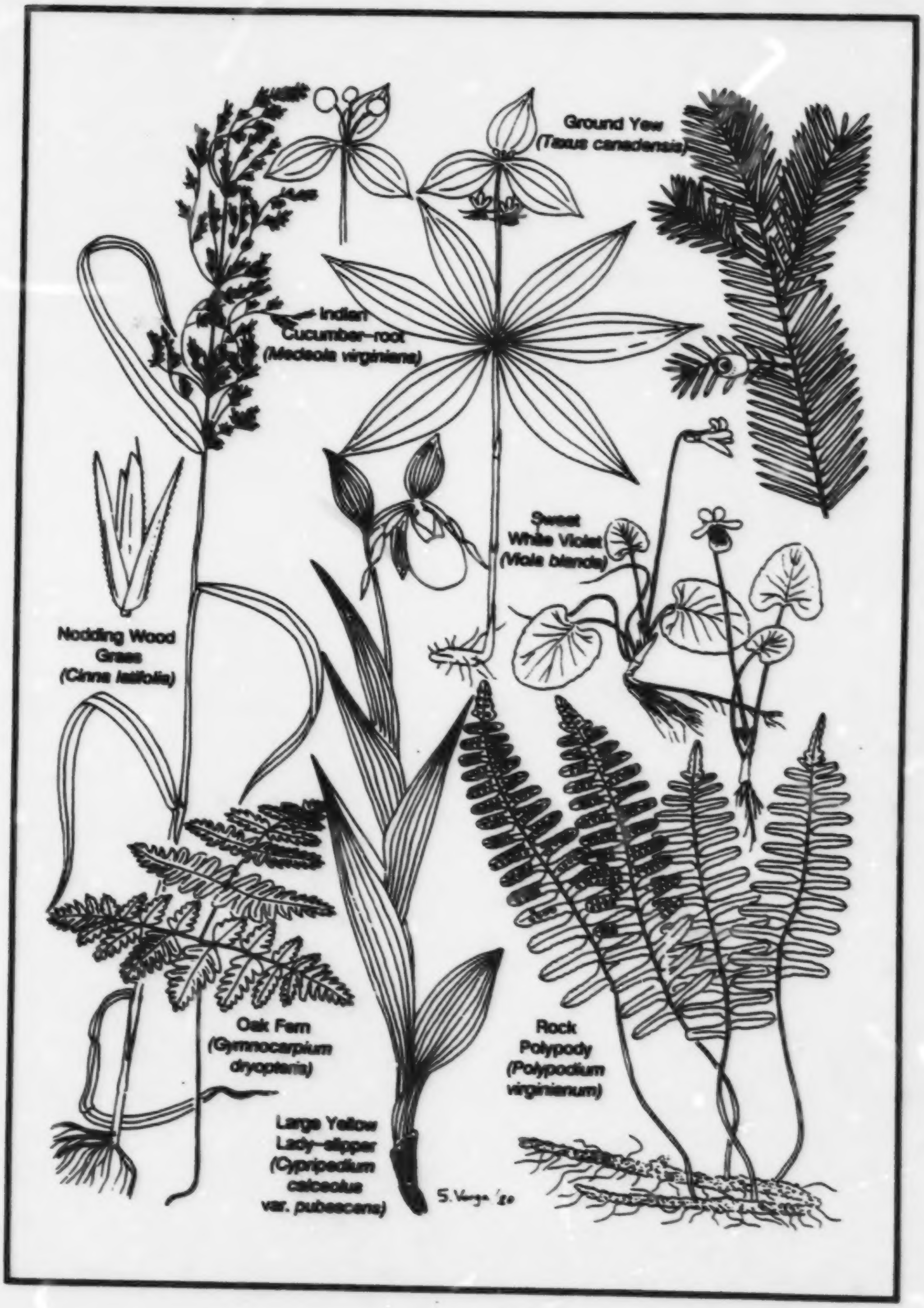

Ground Yew
(Taxus canadensis)
Indian
Cucumber-root
(Medeola virginiana)
Sweet
White Violet
(Viola blanda)
Nodding Wood
Grass
(Cinna latifolia)
Oak Fern
(Gymnocarpium
dryopteris)
Rock
Polypody
(Polypodium
virginianum)
Large Yellow
Lady-slipper
(Cypripedium
calceolus
var. pubescens)
S. Varga '80

Figure 19. Plants of the mesic mixed Hemlock and White Cedar forest slopes (CT 19).

Figure 20. 130 Year old White Pine stand, Morningside Creek (CT 18b) (JLR 1991).

Figure 21. River gravel bar on the Rouge River south of Twyn Rivers Drive (CT 27) (JLR 1991).

20. Conifer Valley Slope Forest: White Cedar
26. Conifer High Valley Terrace Forest: White Cedar

Forests in which White Cedar (*Thuja occidentalis*) make up over seventy-five percent of the tree canopy occur as young stands on valley slopes (CT 20) and high valley terraces (CT 26). They are found on Little Rouge Creek west and east of Plug Hat Road, on Morningside Creek, and on the west side of the Rouge River south of Twyn Rivers Drive.

In the tree canopy, there are occasional stems of White Ash (*Fraxinus americana*), White Birch (*Betula papyrifera*), White Pine (*Pinus strobus*), Black Cherry (*Prunus serotina*), Balsam Poplar (*Populus balsamifera*), Ironwood (*Ostrya virginiana*), Hemlock (*Tsuga canadensis*), White Elm (*Ulmus americana*), Basswood (*Tilia americana*), hawthorns (*Crataegus* sp.), and the domestic apple (*Malus domestica*). In one semi-mature stand, located on the southwest corner of Steeles Avenue and Reesor Road, large White Pines overtop the White Cedar, and constitute an important secondary tree species.

The sparse understorey under the dense conifers commonly includes Bulblet Fern (*Cystopteris bulbifera*), Enchanter's Nightshade (*Circaea lutetiana*), and Poison-ivy (*Rhus radicans*). In a number of stands, the exotic Dog-strangling Vine (*Vincetoxicum rossicum*) has invaded to form large colonies.

Significant species: the regionally rare Black Walnut (*Juglans nigra*).

TABLELANDS AND HIGH VALLEY TERRACES

21. Dry Deciduous Tableland Forest: Red Oak - White Oak

The best examples of dry tableland forests are on the interfluvial tableland between the Rouge River and Little Rouge Creek, south of Twyn Rivers Drive. Smaller examples also occur on an isolated knoll above the Rouge River just north of Finch Avenue, and along the valley rim on the east side of Little Rouge Creek south of Twyn Rivers Drive. Dry, sandy loam soils support a semi-open tree canopy of Red Oak (*Quercus rubra*) and White Oak (*Quercus alba*), with Red Maple (*Acer rubrum*), White Pine (*Pinus strobus*) and, occasionally, Sugar Maple (*Acer saccharum*) as secondary tree species.

Prominent in the understorey is a tall shrub layer of Rough-leaved Dogwood (*Cornus rugosa*), Witch-hazel (*Hamamelis virginiana*), and medium high shrubs such as Maple-leaved Viburnum (*Viburnum acerifolium*) and Chokecherry (*Prunus virginiana*). There is also a scattered low shrub layer of Bush-honeysuckle (*Diervilla lonicera*) and Snowberry (*Symphoricarpos albus*).

Common herbs include Wild Sarsaparilla (*Aralia nudicaulis*), Blue-stem Goldenrod (*Solidago caesia*), Bracken Fern (*Pteridium aquilinum*), a sedge (*Carex pensylvanica*), Large-leaved Aster (*Aster macrophyllus*), a tick-trefoil (*Desmodium glutinosum*), Poison-ivy (*Rhus radicans*), Northern Bedstraw (*Galium boreale*), and Riverbank Grape (*Vitis riparia*).

Significant species: the provincially and nationally rare Sharp-leaved Goldenrod (*Solidago arguta**); sixteen regionally rare species including Early Sweet Blueberry (*Vaccinium pallidum**), Canada Brome (*Bromus pubescens*), sedges (*Carex foenea**, *C. cephalophora*), panic-grasses (*Panicum xanthophysum*, *P. latifolium*), Slender Wheat Grass (*Agropyron trachycaulum*), White Grass (*Leersia virginica*), Robin's Plantain (*Erigeron pulchellus*), Canada Milk-vetch (*Astragalus canadensis**), Stickseed (*Hackelia deflexa*), Large-leaved Figwort (*Scrophularia lanceolata**), Bearded Shorthusk (*Brachyelytrum erectum*), Hairy Beard-tongue (*Penstemon hirsutus*), a hawthorn (*Crataegus pringlei*), Yellow Pimpernel (*Taenidia integerrima*); and the locally rare Hairy Goldenrod (*Solidago hispida*), Lowbush Blueberry (*Vaccinium angustifolium*) and Pink Pyrola (*Pyrola asarifolia**). The six asterisked species are largely or entirely restricted to this oak forest type.

22. Dry Mesic Deciduous Tableland and High Valley Terrace Forests

- **a. Red Oak - Sugar Maple - Red Maple**
- **b. Red Maple - Red Oak - White Oak**
- **c. Sugar Maple - Red Maple - White Pine**
- **d. Red Oak - White Birch**

These dry mesic deciduous forests are confined to the southern half of the park. The largest stands are situated on tablelands east of Little Rouge Creek and south of Twyn Rivers Drive, on the interfluvial tableland north of Twyn Rivers Drive, and just south of Highway 401, around Finch Avenue on the Rouge River, and at the mouth of Morningside Creek. The soils are largely sandy loam or occasionally clay loam. A quantitatively sampled stand had a soil profile of sandy loam with a slightly acidic to neutral pH of 7.2 and 7.5 (R8 in Table 3).

On the tableland east of Little Rouge Creek, there is a large stand of Red Maple (*Acer rubrum*), with Red Oak (*Quercus rubra*), White Oak (*Quercus alba*) and, to lesser extent, Sugar Maple (*Acer saccharum*) as important co-dominants (CT 22b). Under the semi-open tree canopy there is a shrub layer of Witch-hazel (*Hamamelis virginiana*), Rough-leaved Dogwood (*Cornus rugosa*), Beaked Hazel (*Corylus cornuta*), Maple-leaved Viburnum (*Viburnum acerifolium*), Chokecherry (*Prunus virginiana*), and Blue-beech (*Carpinus caroliniana*). Common herbs include White Trillium (*Trillium grandiflorum*), False Solomon's-seal (*Smilacina racemosa*), May-apple (*Podophyllum peltatum*), Blue-stem Goldenrod (*Solidago caesia*), Enchanter's Nightshade (*Circaea lutetiana*), a sedge (*Carex pensylvanica*), Wild Sarsaparilla (*Aralia nudicaulis*), Bracken Fern (*Pteridium aquilinum*), and Large-leaved Aster (*Aster macrophyllus*).

A moister stand on the same tableland sustains a Sugar Maple - Red Maple - White Pine forest (CT 22c), with Poison-ivy (*Rhus radicans*) and the shrub Witch-hazel (*Hamamelis virginiana*) common in the understorey.

Most prevalent, however, are forests of Red Oak, with Sugar Maple and Red Maple important secondary tree species (CT 22a). Beech (*Fagus grandifolia*), White Birch (*Betula papyrifera*) and White Pine can also be important trees. In a few young stands, White Birch can be co-dominant with Red Oak.

On drier sites, these Red Oak forests support a shrub layer similar to CT 22b. Common herbs include Bracken Fern, Large-leaved Aster, White Trillium, Blue-stem Goldenrod, Wild Sarsaparilla, a solomon's-seal (*Polygonatum pubescens*), sedges (*Carex pensylvanica, C. pedunculata*), and Early Meadow-rue (*Thalictrum dioicum*). On moister sites, Sugar Maple tends to co-dominate with Red Oak and shrubs are less common. Herbs more typical of mesic sites, such as Zig-zag Goldenrod, are present.

Significant species: ten regionally rare species including: Hairy Honeysuckle (*Lonicera hirsuta**), Slender Wheat Grass Agropyron trachycaulum), Poke Milkweed (*Asclepias exaltata*), Sicklepod (*Arabis canadensis*), sedges (*Carex cephalophora, C. woodii**), a panic grass (*Panicum latifolium*), Canada Brome (*Bromus pubescens*), Robin's Pantain (*Erigeron pulchellus*) a mountain-rice (*Oryzopsis racemosa*); and the locally rare sedge (*Carex hirtifolia*). The two asterisked species are restricted to these dry mesic forests.

23. Mesic Deciduous Tableland and High Valley Terrace Forest

- **a. Sugar Maple - Black Maple**
- **b. Sugar Maple**
- **c. Beech - Sugar Maple - White Ash**
- **d. Sugar Maple - White Ash**
- **e. Sugar Maple - White Birch**

Mesic deciduous forests on valley terraces above the present floodplain are largely found in the northern half of the park, such as near the Rouge River south and west of the Metro Toronto Zoo, and north of the CPR line, and above Little Rouge Creek south of Steeles Avenue and west of the Beare Road landfill. Tableland forests are also restricted to the northern half of the park, with large stands northwest of the corner of Reesor Road and

Finch Avenue, at the 'Core Woods' in the Metro Toronto Zoo, and at two isolated woodlots west of Sewells Road.

The soils are consistently loams, occasionally clay loams, with a basic pH of 7.8, and a relatively high organic content. Two stands were sampled quantitatively (R6 and R9 in Table 3).

On the richest sites, Sugar Maple (*Acer saccharum*) and Black Maple (*Acer nigrum*) dominate in the tree layer, with an understorey of Wild Leek (*Allium tricoccum*) and Blue Cohosh (*Caulophyllum thalictroides*) (CT 23a) (R9 in Table 3). Most of the stands, particularly those on the valley terraces are dominated by mature trees of Sugar Maple. There is only a scattering of other trees such as White Ash (*Fraxinus americana*), Beech (*Fagus grandifolia*), Black Maple (*Acer nigrum*), and White Elm (*Ulmus americana*) (CT 23a). On younger sites, Sugar Maple shares dominance with White Ash (CT 23d), or White Birch (*Betula papyrifera*) (CT 23e).

There are few shrubs under the closed tree canopy. However, the spring vernal display of wildflowers is outstanding, especially on rich loamy soils. Most common are Wild Leek (*Allium tricoccum*), Yellow Trout-lily (*Erythronium americanum*), Bloodroot (*Sanguinaria canadensis*) and, in a few stands, Squirrel-corn (*Dicentra canadensis*). Other common herbs include: Blue Cohosh (*Caulophyllum thalictroides*), Zig-zag Goldenrod (*Solidago flexicaulis*), Wild Ginger (*Asarum canadense*), Enchanter's Nightshade (*Circaea lutetiana*), Virginia Waterleaf (*Hydrophyllum virginianum*), May-apple (*Podophyllum peltatum*), and a sedge (*Carex pedunculata*).

Common on the tablelands are forests of Sugar Maple and Beech, with White Ash a common secondary species (CT 23c). The understorey has a herbaceous layer of Virginia Waterleaf, Wild Leek, Yellow Trout-lily, White Trillium, Blue Cohosh, May-apple, Zig-zag Goldenrod and Wild Ginger.

Significant species: eight regionally rare species such as Canada Waterleaf (*Hydrophyllum virginianum**), sedges (*Carex cephalophora, C. amphibola, C. hitchcockiana, C. cephaloidea*), a mountain-rice (*Oryzopsis racemosa*), Goldie's Fern (*Dryopteris goldiana**), Bearded Shorthusk (*Brachyelytrum erectum*); and four locally rare species, Silvery Glade Fern (*Athyrium thelypterioides**), sedges (*Carex hirtifolia**, *C. sprengelii*), and Showy Orchis (*Galearis spectabilis**). The six asterisked species are largely or entirely confined to this forest type.

24. Dry Mesic Mixed Tableland and High Valley Terrace Forests

a. Hemlock - Red Maple - Sugar Maple - Red Oak - White Oak
b. Red Oak - White Pine

These dry mesic mixed forests are uncommon in the park, restricted to five stands on tablelands just north of Highway 401 (CT 24a), and two stands on a tableland and high valley terrace just south of Highway 401 (CT 24b). All stands occur on sandy loams.

These mixed forests are dominated by Hemlock (*Tsuga canadensis*) and Red Maple (*Acer rubrum*), with some Sugar Maple (*Acer saccharum*), White Oak (*Quercus alba*), Red Oak (*Quercus rubra*), and White Pine (*Pinus strobus*) (CT 24a). White Pine was an important secondary species, which was selectively logged in the 1960s (about 500 pines removed, with ages up to 135 years old). On a slightly moister site Beech (*Fagus grandifolia*) and White Ash (*Fraxinus americana*) are also common, while on a drier knoll, Red Maple and Sugar Maple are less plentiful.

In the largest stand, on the interfluvial tableland between the Rouge River and Little Rouge Creek valleys, there is a scattered shrub layer of Red-berried Elder (*Sambucus pubens*), Beaked Hazel (*Corylus cornuta*), Maple-leaved Viburnum (*Viburnum acerifolium*) and Common Blackberry (*Rubus allegheniensis*), with such common herbs as Wild Sarsaparilla (*Aralia nudicaulis*), Glandular Woodfern (*Dryopteris intermedia*), Sweet Cicely (*Osmorhiza claytonii*), Blue-stem Goldenrod (*Solidago caesia*), False Solomon's-seal (*Smilacina racemosa*), Wild Lily-of-the-valley (*Maianthemum canadense*), Bracken Fern (*Pteridium aquilinum*), Lopseed (*Phryma leptostachya*), a solomon's-seal (*Polygonatum pubescens*), a tick-trefoil (*Desmodium glutinosum*), and Enchanter's

Nightshade (*Circaea lutetiana*). On the moister sites, Poison-ivy (*Rhus radicans*), Zig-zag Goldenrod (*Solidago flexicaulis*) and White Trillium (*Trillium grandiflorum*) are also frequent.

The two stands south of Highway 401 sustain Red Oak forests with White Pine a co-dominant species (CT 24b). Other tree species include Red Maple, Beech, White Birch (*Betula papyrifera*) and, in a moister stand, Sugar Maple. There is a common shrub layer of Chokecherry (*Prunus virginiana*), Beaked Hazel (*Corylus cornuta*), Witch-hazel (*Hamamelis virginiana*), Rough-leaved Dogwood (*Cornus rugosa*), Common Buckthorn (*Rhamnus cathartica*), and Wild Red Raspberry (*Rubus strigosus*). Prevalent herbs include False Solomon's-seal (*Smilacina racemosa*), Early Meadow-rue (*Thalictrum dioicum*), Starry False Solomon's-seal (*Smilacina racemosa*), and Poison-ivy (*Rhus radicans*).

Significant species: three regionally rare species, including Riverbank Wild Rye (*Elymus riparius*) and White Grass (*Leersia virginica*) along a trail on the interfluvial tableland (CT 24a), and Sicklepod (*Arabis canadensis*).

25. Mesic Mixed Tableland and High Valley Terrace Forest

a. Hemlock - Sugar Maple
b. Hemlock - Beech - Sugar Maple
c. Hemlock - Sugar Maple - Red Oak
d. White Cedar - Hemlock - hardwood
e. White Cedar - hardwood

These mesic mixed forests are largely found on high terraces in the river valleys throughout the park. There are also a few stands on tablelands. The soils are loams or clay loams. Most common are mixed forests of Hemlock (*Tsuga canadensis*) and Sugar Maple (*Acer saccharum*) (CT 25a) with a scattering of such trees as Beech (*Fagus grandifolia*), Red Maple (*Acer rubrum*), White Pine (*Pinus strobus*), White Ash (*Fraxinus americana*), White Cedar (*Thuja occidentalis*), White Birch (*Betula papyrfiera*), Red Oak (*Quercus rubra*) and Yellow Birch (*Betula alleghaniensis*). In some stands, Beech (CT 25b), or Red Oak (CT 25c) or White Cedar (CT 25d) share co-dominance with Hemlock and Sugar Maple.

Plentiful in the understorey on rich sites, are such ferns as Marginal Woodfern (*Dryopteris marginalis*), woodferns (*Dryopteris intermedia, D. carthusiana*), Bulblet Fern (*Cystopteris bulbifera*) and, occasionally, Ostrich Fern (*Matteuccia struthiopteris*). Other common herbs include Enchanter's Nightshade (*Circaea lutetiana*), Zig-zag Goldenrod (*Solidago flexicaulis*), Rose-twisted Stalk (*Streptopus roseus*), Virginia Creeper (*Parthenocissus inserta*), Jack-in-the-pulpit (*Arisaema triphyllum*) and Yellow Jewelweed (*Impatiens pallida*). Ground Yew (*Taxus canadensis*) sometimes forms a common shrub layer.

On slightly drier sites, where Red Oak is often an important secondary tree species (CT 25c, 25d), such herbs as Blue-stem Goldenrod (*Solidago caesia*), a sedge (*Carex pedunculata*), Bracken Fern (*Pteridium aquilinum*) and Wild Sarsaparilla (*Aralia nudicaulis*) are frequent. Stands with a large number of beech trees (CT 25b) tend to have a depauperate understorey due to the heavy beech litter.

There are three small stands where White Cedar is the sole dominant (CT 25e). Important secondary tree species include Sugar Maple, and to a lesser extent White Ash and White Birch. Two of the stands are situated on cliff edges, one with a rich understorey of Bulblet Fern, and the drier second stand with an understorey of Wild Sarsaparilla and a sedge (*Carex pedunculata*).

Significant species: two regionally rare species, more typical of bottomlands, Riverbank Wild Rye (*Elymus riparius*) and White Grass (*Leersia virginica*) along a trail, and the regionally rare mountain-rice (*Oryzopsis racemosa*).

PRIMARY

27. Riverine Gravel and Sand Bar

Along the Rouge River and Little Rouge Creek north of Highway 401, gravel and sand bars are deposited on the accretion sides of river meanders. In these dynamic communities, plants are adapted to frequent flooding and erosion. The communities change in appearance from year to year, and even from month to month, depending on storm events, chance seed dispersal and other factors. The riverine gravel beds are used extensively as nest sites by turtles, especially snapping turtles.

Closest to the waters edge, on the shifting substrates, the sparse cover of weedy and shoreline species includes White Sweet Clover (*Melilotus alba*), Cocklebur (*Xanthium strumarium*), knotweeds (*Polygonum lapathifolium*, *P. persicaria*), Reed Canary Grass (*Phalaris arundinacea*), Nodding Beggarticks (*Bidens cernua*), Coltsfoot (*Tussilago farfara*), Barnyard Grass (*Echinochloa crusgalli*), Cut Grass (*Leersia oryzoides*), Purple Loosestrife (*Lythrum salicaria*), Redtop (*Agrostis gigantea*) and Creeping Bent Grass (*Agrostis stolonifera*). Small seedlings of willows (*Salix exigua*, *S. eriocephala*) and Eastern Cottonwood (*Populus deltoides*) are also common.

28. Great Lakes Shoreline
- **a. Dry Beach Strand**
- **b. Moist Beach Strand**
- **c. Wet Meadow: Nelson's Horsetail - Baltic Rush**

Great Lakes shoreline in the park is restricted to an 800 m stretch of sand, most of which is actively used as a public bathing beach (CT 42f). The native beach strands and wet meadows are found on the 350 meters of shore on the east side of the Rouge River mouth.

The extent and location of these shoreline habitats varies greatly from year to year in response to storm events, Lake Ontario water levels and littoral currents (Fig. 33, Chapter II.vi.). For example, from 1987 to 1990, there was a large spit of land on the east side of the river mouth, providing new habitat for rare native shoreline plants. By 1990, however, the spit had washed away.

The moist beach strand near the waters edge (CT 28b), supports many of the native species typically occurring only on Great Lakes shores in Ontario, including the Great Lakes Sea-rocket (*Cakile edentula* var. *lacustris*), Bushy Cinquefoil (*Potentilla paradoxa*), Seaside Spurge (*Euphorbia polygonifolia*), and nut-grasses (*Cyperus engelmannii*, *C. odoratus*). Other common species consist of Silverweed (*Potentilla anserina*), a goosefoot (*Chenopodium rubrum*), Toad Rush (*Juncus bufonius*), and seedlings of Sandbar Willow (*Salix exigua*).

The drier beach strands (CT 28a), away from the shores, support species more typical of field habitats, Canada Goldenrod (*Solidago canadensis*), Heath Aster (*Aster ericoides*), Tall White Aster (*Aster lanceolatus*), New England Aster (*Aster novae-angliae*), Canada Blue Grass (*Poa compressa*), and Meadow Fescue (*Festuca arundinacea*). On a more stable sand ridge, there are scattered trees of Balsam Poplar (*Populus balsamifera*) and Eastern Cottonwood (*Populus deltoides*), with a common shrub layer of Sandbar Willow (*Salix exigua*) and Heartleaf Willow (*Salix eriocephala*).

Behind the shoreline beach and the sand ridge thickets is a small wet meadow (CT 28c). Close to the water table, this meadow is flooded in the spring, the season of highest lake levels. During the lower lake levels of summer and early fall, standing water is absent, but the soils are still moist. Prominent meadow species here are the Baltic Rush (*Juncus balticus*), Nelson's Horsetail (*Equisetum Xnelsonii* - particularly on the drier meadow edges), Canary Reed Grass (*Phalaris arundinacea*), Canada Blue-joint (*Calamagrostis canadensis* - mainly in the wetter portions of the meadow), a sedge (*Carex lanuginosa*) and Silverweed (*Potentilla anserina*).

Significant species: the wet meadow (CT 28c) supports four regionally rare species, including False Pimpernel (*Lindernia dubia*), Slender Gerardia (*Agalinus tenuifolia*), Nelson's Horsetail, Baltic Rush; and the locally rare Short-awned Foxtail (*Alopecurus aequalis*). The moist beach strand (CT 28b) has the provincially rare Bushy Cinquefoil*; and four regionally rare species: Sea-rocket*, Seaside Spurge*, Engelmann's Nut-grass (*Cyperus engelmannii**) and Baltic Rush*. The five asterisked species are restricted or largely restricted in the park to these shoreline habitats.

d. Mudflat

Shoreline mudflats occur throughout the southern portions of the lakefront marsh during low lake level years, such as occurred in the fall of 1989. The exposed mudflats are quickly colonized by a number of annual species. During high lake levels these annual species remain dormant in the mud; such seedbanks remain viable for a number of years, and only germinate when the muds are exposed during low water levels.

The most common annual species on these mudflats include Water Purslane (*Ludwigia palustris*), False Pimpernel (*Lindernia dubia*), spikerushes (*Eleocharis intermedia, E. acicularis*), Nut-grasses (*Cyperus engelmannii, C. odoratus*), and beggarticks (*Bidens tripartita, B. cernua*).

Significant species: four regionally rare species including: Engelmann's Nut-grass (*Cyperus engelmannii*), False Pimpernel, a spikerush (*Eleocharis intermedia*), and Water Purslane. These four species are restricted or largely restricted in the park to this mudflat habitat.

29. Unconsolidated Bluff

a. Seepage Meadow
b. Moist

Unconsolidated bluffs occur at 56 sites throughout the park, wherever the upland ridges and high terraces are undercut by river meanders. They are most spectacularly developed in the Rouge River valley north of Finch Avenue, west of the Metro Toronto Zoo, south of the zoo, and at Twyn Rivers Drive and on the lower valley of Morningside Creek, and in Little Rouge Creek valley north of Twyn Rivers Drive. A few of the bluffs attain heights of 75 meters.

The most actively eroding bluffs consist largely of bare tills and sediments, with only a scattering of Coltsfoot (*Tussilago farfara*) and Field Horsetail (*Equisetum arvense*). More stable bluffs, particularly those not being actively undercut, support such typical field species as Canada Goldenrod (*Solidago canadensis*), White Sweet Clover (*Melilotus alba*), Poison-ivy (*Rhus radicans*) and Narrow-leaf Goldenrod (*Solidago graminifolia*). Bluffs stable over a longer period of time have tree saplings and seedlings of Balsam Poplar (*Populus balsamifera*), Trembling Aspen (*P. tremuloides*), White Cedar (*Thuja occidentalis*), White Ash (*Fraxinus americana*), White Birch (*Betula papyrifera*) and Heartleaf Willow (*Salix eriocephala*).

On a few bluffs, aquifer discharges sustain wet communities (CT 29a) of Narrow-leaved Cattail (*Typha angustifolia*), Field Horsetail, Coltsfoot, Sensitive Fern (*Onoclea sensibilis*), and Variegated Horsetail (*Equisetum variegatum*). Other prevalent wetland species include: Fowl Manna Grass (*Glyceria striata*), a rush (*Juncus dudleyi*), and Boneset (*Eupatorium perfoliatum*).

ANTHROPOGENIC COMMUNITY TYPES

Anthropogenic communities are those which have been essentially created by human activities. They cover approximately 31% of the Rouge Valley Park. Most prominent are fields, many of which are regenerating naturally to thickets and deciduous successional forests.

30. Field

a. & b. Association of Canada Blue Grass, Kentucky Blue Grass, Timothy, Brome Grass, Canada Goldenrod; a. with little woody reproduction, and b. with woody reproduction common.

Fields occur throughout the park. Those with little woody regeneration (CT 30a) are found along hydro-right-of-ways, road verges (i.e. Highway 2 and 401 corridor, Meadowvale Road and Beare Road landfill access road), on regraded gravel pits lacking top soil (i.e. uplands between Little Rouge Creek and the Beare Road landfill), and on former cultivated fields abandoned in recent decades (i.e. uplands between the Rouge River and Little Rouge Creek, north of Finch Avenue).

Strong woody regeneration (CT 30b) has occurred on former pastures and cultivated lands in the valley bottomlands and on the uplands. The largest examples occur on the Rouge River between Highway 2 and Meadowvale Road, and west of Sewells Road; on Little Rouge Creek north of Twyn Rivers Drive; the uplands east of Little Rouge Creek and north of Twyn Rivers Drive; the uplands between Sewells and Reesor Roads north of Finch Avenue; and the abandoned CPR line.

Major woody species on these old fields consist of scattered trees and saplings of White Ash (*Fraxinus americana*), Green Ash (*Fraxinus pennsylvanica*), White Elm (*Ulmus americana*), Trembling Aspen (*Populus tremuloides*), Large-toothed Aspen (*Populus grandidentata*), Apple (*Malus domestica*) and, to a lesser extent, White Cedar (*Thuja occidentalis*), White Pine (*Pinus strobus*), White Birch (*Betula papyrifera*), Balsam Poplar (*Populus balsamifera*), Manitoba Maple (*Acer negundo*) and Black Cherry (*Prunus serotina*). There are also scattered shrubs of Staghorn Sumac (*Rhus typhina*), Hawthorn (*Crataegus* sp.), Wild Red Raspberry (*Rubus strigosus*), Red-osier Dogwood (*Cornus stolonifera*) and vines Riverbank Grape (*Vitis riparia*) and Virginia Creeper (*Parthenocissus inserta*).

Most common in field habitats are introduced perennial grasses; Brome Grass (*Bromus inermis*), Kentucky Blue Grass (*Poa pratensis*), Timothy (*Phleum pratense*), Quack Grass (*Agropyron repens*), Meadow Fescue (*Festuca pratensis*), Redtop (*Agrostis gigantea*), Creeping Bent Grass (*Agrostis stolonifera*), Orchard Grass (*Dactylis glomerata*) and, particularly on drier sites, Canada Blue Grass (*Poa compressa*).

Prominent herbs include Canada Goldenrod (*Solidago canadensis*), White Sweet Clover (*Melilotus alba*), Tall Goldenrod (*Solidago altissima*), Wild Bergamot (*Monarda fistulosa*), New England Aster (*Aster novae-angliae*), Heath Aster (*Aster ericoides*), Blueweed (*Echium vulgare*), Wild Carrot (*Daucus carota*), Rough-fruited Cinquefoil (*Potentilla recta*), Bird Vetch (*Vicia cracca*), Scouring Rush (*Equisetum hyemale*), Canada Tick-trefoil (*Desmodium canadense*), Canada Thistle (*Cirsium arvense*), Bouncing-bet (*Saponaria officinalis*), Common Milkweed (*Asclepias syriaca*), Early Goldenrod (*Solidago juncea*), Grey Goldenrod (*Solidago nemoralis*), and Oxe-eye Daisy (*Chrysanthemum leucanthemum*). A number of fields have been taken over by the introduced Dog-strangling Vine (*Vincetoxicum rossicum*).

Significant species: a provincially rare hawthorn (*Crataegus corusca*), and eleven regionally rare species including Red Cedar (*Juniperus virginiana*), hawthorns (*Crataegus aboriginum*, C. flabellata, *C. holmesiana*, *C. pringlei*), nut-grasses (*Cyperus strigosus*, *C. lupulinus*), Fringed Gentian (*Gentiana crinita*), a sedge (*Carex rugosperma*), an evening-primrose (*Oenothera oakesiana*), an aster (*Aster pilosus* var. *pilosus*); and two locally rare species Hoary Vervain (*Verbena stricta*) and a sedge (*Carex muhlenbergii*).

c. Big Bluestem

Two small clearings, surrounded by dry Red Oak - White Oak forests, are dominated by the native grass Big Bluestem (*Andropogon gerardii*). This community is situated just north of Highway 2 on dry, southfacing valley crests with sandy loam soils.

Other common species include Canada Blue Grass (*Poa compressa*), Poison-ivy (*Rhus radicans*), Timothy (*Phleum pratense*), Wild Bergamot (*Monarda fistulosa*), White Sweet Clover (*Melilotus alba*), Woodland Sunflower (*Helianthus divaricatus*), a sedge (*Carex pensylvanica*), Canada Tick-trefoli (*Desmodium canadense*), Poverty Oat grass (*Danthonia spicata*), and Bracken Fern (*Pteridium aquilinum*).

A number of species in these openings have affinities with prairie and savannah habitats, including Big Bluestem, Azure Aster (*Aster azureus*), White Snakeroot (*Polygala senega*), Canada Tick-trefoil, Bastard Toadflax (*Comandra umbellata*), and New Jersey-tea (*Ceanothus americanus*).

Significant species: the provincially rare Shy Bulrush (*Scirpus verecundus* - one small clump), and seven regionally rare species consisting of Hairy Agrimony (*Agrimonia pubescens**), Yellow Pimpernel (*Taenidia integerrima*), Hairy Beard-tongue (*Penstemon hirsutus*), Seneca Snakeroot*, a sedge (*Carex rugosperma**), and White Goldenrod*). The four asterisked species are restricted or largely restricted to these Big Bluestem openings.

d. Roadsides and Railway Embankments

Railway ballast on the park's three railways, and the gravel edges of roadways in the park support many of the same weedy species found in typical field habitats (CT 30a, 30b). Some weedy species, particularly annual ones, however, are largely confined to these highly disturbed habitats. They consist of a dock (*Rumex longifolius*), Common Flax (*Linum usitatissimum*), Biennial Wormweed (*Artemisia biennis*), Dwarf Snapdragon (*Chaenorrhinum minus*), Narrow Hawk's-beard (*Crepis tectorum*), Prickly Lettuce (*Lactuca serriola*), Annual Thistle (*Sonchus oleraceus*), Cypress Spurge (*Euphorbia cyparissias*), a spurge (*Euphorbia dentata*), Wild Radish (*Raphanus raphanistrum*), Oats (*Avena sativa*), Hairy Chess (*Bromus commutatus*), Overlooked Dropseed (*Sporobolus neglectus*), a sedge (*Carex praegracilis*), Kochia (*Kochia scoparia*), Scarlet Pimpernel (*Anagallis arvensis*), Rayless Aster (*Aster brachyactis*), and Spearscale (*Atriplex patula*). The last five species are halophytes, adapted to soils with high salt contents, such as those along roadways and railways, and at the outlets of road and bridge drains.

31. Thickets

- a. **Grey Dogwood**
- b. **Staghorn Sumac**
- c. **Hawthorn**
- d. **Rough-leaved Dogwood**
- e. **Disturbed: Japanese Knotweed, Lilac, European Highbush Cranberry, Common Buckthorn**

Thickets occur throughout the park. Most common are thickets of Staghorn Sumac (*Rhus typhina*) (CT 31b) and hawthorn (*Crataegus* sp.) (CT 31c), or a combination of the two. Thickets of Grey Dogwood (*Cornus racemosa*) (CT 31a) and Rough-leaved Dogwood (*Cornus rugosa*) (CT 31d) are restricted to three stands, two on southfacing slopes in the Little Rouge Creek valley, one north and one south of Twyn Rivers Drive, and a third on the west side of the Rouge River just north of Tywn Rivers Drive. Rarely, there are disturbed thickets (CT 31e) of Japanese Knotweed (*Polygonum cuspidatum*), Lilac (*Syringa vulgaris*), European Highbush Cranberry (*Viburnum opulus* var. *opulus*), and Common Buckthorn (*Rhamnus cathartica*).

Secondary shrub species include Wild Red Raspberry (*Rubus strigosus*), Common Blackberry (*Rubus allegheniensis*), Nannyberry (*Viburnum lentago*), Riverbank Grape (*Vitis riparia*), and Witch-hazel (*Hamamelis virginiana*).

Scattered amongst the shrubs are trees and saplings of White Elm (*Ulmus americana*), White Ash (*Fraxinus americana*), White Cedar (*Thuja occidentalis*), Large-toothed Aspen (*Populus grandidentata*), Trembling Aspen (*P. tremuloides*), White Birch (*Betula papyrifera*), White Pine (*Pinus strobus*), Apple (*Malus domestica*), Ironwood (*Ostrya virginiana*), Basswood (*Tilia americana*), Black Cherry (*Prunus serotina*), Manitoba Maple (*Acer negundo*), Balsam Poplar (*Populus balsamifera*) and, on drier sites, Red Oak (*Quercus rubra*).

Common herbs and grasses consist of Canada Goldenrod (*Solidago canadensis*), Bracken Fern (*Pteridium aquilinum*), Common Strawberry (*Fragaria virginiana*), a sedge (*Carex pensylvanica*), Quack Grass (*Agropyron repens*), Kentucky Blue Grass (*Poa pratensis*), Canada Blue Grass (*Poa compressa*), Poison-ivy (*Rhus radicans*), Enchanter's Nightshade (*Circaea lutetiana*), Fringed Loosestrife (*Lysimachia ciliata*), and Eleocampane (*Inula helenium*). A number of thickets have been heavily infested by the introduced Dog-Strangling Vine (*Vincetoxicum rossicum*).

Significant species: the provincially rare hawthorn (*Crategus corusca*) and seven regionally rare species including hawthorns (*Crategus aboriginum, C. flabellata, C. holmesiana, C. pringlei*), Hairy Agrimony (*Agrimonia pubescens*), Robin's Plantain (*Erigeron pulchellus*), and Yellow Pimpernel (*Taenidia integerrima*).

32. Deciduous Successional Forest

- **a. White Birch**
- **b. Large-toothed Aspen**
- **c. Trembling Aspen**
- **d. Balsam Poplar**
- **e. White Ash**
- **f. Green Ash - White Ash**
- **g. White Elm**
- **h. Bitternut Hickory**
- **i. Ironwood**
- **j. Disturbed: Manitoba Maple, Norway Maple**

Deciduous successional forests have developed on lands clearcut between the 1930s and 1950s, and on former cultivated fields or pastures. White Birch (CT 32a) is the most common dominant tree species, followed in descending order by Large-toothed Aspen (*Populus grandidentata*) (CT 32b), White Ash (*Fraxinus americana*) (CT 32e), Trembling Aspen (*P. tremuloides*) (CT 32c), Balsam Poplar (CT 32d), mixed stands of White Ash and Green Ash (*Fraxinus pennsylvanica*) (CT 32f), and White Elm (*Ulmus americana*) (CT 32g). There are also a few stands where Bitternut Hickory (CT 32h) and Ironwood (CT 32i) are dominant tree species. Occasionally, disturbed forests of Manitoba Maple and Norway Maple (CT 30j) are found in the park.

Soils vary from clay loam to sandy loam, and soil moisture ranges from dry to wet mesic. The White Birch, aspen, and disturbed stands (CT 32 a,b,c,j) exhibit the widest variation in soil moisture, while the ash, White Elm, Bitternut Hickory (*Carya cordiformis*) and Balsam Poplar stands (CT 32 d,e,f,g) are restricted to moist soils. White Elm generally occurs on the wetter sites. Ironwood (*Ostrya virginiana*) stands (CT 32i) are found on dry mesic soils.

Common secondary tree species in White Birch, White Ash, Bitternut Hickory, and Ironwood stands include, on moist sites, White Ash, White Birch, Sugar Maple, Ironwood, Black Cherry (*Prunus serotina*), and Basswood (*Tilia americana*); and on drier sites White Ash, White Birch, Large-toothed Aspen, Red Oak (*Quercus rubra*), Red Maple (*Acer rubrum*), White Oak (*Quercus alba*) and White Pine (*Pinus strobus*). In the generally younger aspen and disturbed stands (CT 32b,c,d,j) common secondary species are White Ash, White Birch and, occasionally, White Elm and White Pine in the aspen stands. White Elm forests are commonly associated with White Ash. Mixed stands of White Ash and Green Ash have such associates as Balsam Poplar, White Birch, and Trembling Aspen.

Under the semi-open canopy of drier stands, particularly the White Birch (CT 32a) and aspen (CT 32b,c,d) forests, there is a common shrub layer of Rough-leaved Dogwood (*Cornus rugosa*) and, occasionally, Witch-hazel (*Hamamelis virginiana*), hawthorns (*Crataegus* sp.), Nannyberry (*Viburnum lentago*), Grey Dogwood

(*Cornus racemosa*), and Chokecherry (*Prunus virginiana*). On mesic sites there is a scattered shrub layer of Mountain Maple (*Acer spicatum*), Alternate-leaved Dogwood (*Cornus alternifolia*), hawthorns, Chokecherry and the occasional infestation of the introduced Common Buckthorn (*Rhamnus cathartica*). Frequent also on younger sites are such shrubs and vines as Common Blackberry (*Rubus allegheniensis*), Staghorn Sumac (*Rhus typhina*), Wild Raspberry (*Rubus strigosus*), Red-osier Dogwood (*Cornus stolonifera*), Riverbank Grape (*Vitis riparia*), and Virginia Creeper (*Parthenocissus inserta*).

In the youngest stands, where the trees are just over 15 cm in diameter, the herbaceous layer is a mixture of field and forest species, consisting of Canada Goldenrod (*Solidago canadensis*), Poison-ivy (*Rhus radicans*), Bracken Fern (*Pteridium aquilinum*), Canada Blue Grass (*Poa compressa*), Kentucky Blue Grass (*Poa pratensis*), sedges (*Carex pensylvanica*, *C. pedunculata*), Enchanter's Nightshade (*Circaea lutetiana*), Blue-stem Goldenrod (*Solidago caesia*), False Solomon's-seal (*Smilacina racemosa*), White Avens (*Geum canadense*), and the occasional infestation of the introduced Dog-strangling Vine (*Vincetoxicum rossicum*). On moister sites, Fringed Loosestrife (*Lysimachia ciliata*), Field Horsetail (*Equisetum arvense*) and Ostrich Fern (*Matteuccia struthiopteris*) can also be common.

On older mesic sites, particularly the White Birch (CT 32a), Bitternut Hickory (CT 32h), and White Ash (CT 32e) forests, there is a rich herbaceous layer of Wild Ginger (*Asarum canadense*), Zig-zag Goldenrod (*Solidago flexicaulis*), Yellow-trout Lily (*Erythronium americanum*), White Trillium (*Trillium grandiflorum*), Virginia Waterleaf (*Hydrophyllum virginianum*), a sedge (*Carex pedunculata*), and occasionally White Snakeroot (*Eupatorium rugosum*), Bulblet Fern (*Cystopteris bulbifera*), Early Meadow-rue (*Thalictrum dioicum*), Wild Sarsaparilla (*Aralia nudicaulis*), Ostrich Fern, and Enchanter's Nightshade.

Common herbs in older, drier White Birch stands consist of Poison-ivy, Blue-stem Goldenrod, Large-leaved Aster (*Aster macrophyllus*), Early Meadow-rue, False Solomon's-seal, Wild Sarsaparilla, and a sedge (*Carex pensylvanica*).

Weedy species predominate in the understorey of the disturbed Manitoba Maple (CT 32j) forests. They include introduced honeysuckles (*Lonicera* sp.), Common Buckthorn, and Ground-ivy (*Glechoma hederacea*). Other native species in the understorey consist of Poison-ivy, Chokecherry, Riverbank Grape, Canada Goldenrod, White Avens, Staghorn Sumac, Red-osier Dogwood and hawthorns.

Significant species: eleven regionally rare species including sedges (*Carex hitchcockiana*, *C. cephalophora*), hawthorns (*Crataegus pringlei*, *C. flabellata*), a mountain-rice (*Oryzopsis racemosa*), Poke Milkweed (*Asclepias exaltata*), panic-grasses (*Panicum columbianum*, *P. linearifolium*, *P. latifolium*), Hairy beard-tongue (*Penstemon hirsutus*), Wood Rush (*Luzula multiflora*); and the locally rare sedges (*Carex hirtifolia*, *C. sprengellii*).

33. Mixed Successional Forest

- **a. Association of White Birch, Trembling Aspen, Large-toothed Aspen, Balsam Poplar, White Elm, and White Ash with White Cedar**
- **b. Association of White Ash, Trembling Aspen, and White Elm with White Pine**
- **c. White Cedar - White Pine**

Mixed successional forests occur infrequently throughout the park. These young forests have developed on former pastures and cultivated fields, and particularly on valleylands mined for river gravels in the late 1950s. Soil moisture ranges from dry mesic to mesic, and soils vary from sandy loams to clay loams to gravel on the gravel extraction sites.

Two trees, White Cedar (*Thuja occidentalis*) (CT 33a), and to a lesser extent White Pine (*Pinus strobus*) (CT 33b) constitute the conifer element in these forests. They occur in association with such successional deciduous trees as White Birch (*Betula papyrifera*), Trembling Aspen (*Populus tremuloides*), Large-toothed Aspen (*P.

grandidentata), Balsam Poplar (*P. balsamifera*), White Ash (*Fraxinus americana*), and White Elm (*Ulmus americana*). In a few stands, White Cedar and White Pine are co-dominant (CT 33c).

In some stands, particularly on drier soils, there a tall shrub layer of Rough-leaved Dogwood (*Cornus rugosa*) or Witch-hazel (*Hamamelis virginiana*). Other common shrubs and woody vines include Chokecherry (*Prunus virginiana*), Bush-honeysuckle (*Diervilla lonicera*), Riverbank Grape (*Vitis riparia*), Virginia Creeper (*Parthenocissus inserta*), Alternate-leaved Dogwood (*Cornus alternifolia*), and the occasional infestation of the introduced Common Buckthorn (*Rhamnus cathartica*).

The herbaceous layer consists of Poison-ivy (*Rhus radicans*), Enchanter's Nightshade (*Circaea lutetiana*), Fringed Loosestrife (*Lysimachia ciliata*), Wild Sarsaparilla (*Aralia nudicaulis*), Blue-stem Goldenrod (*Solidago caesia*), and on young sites Canada Goldenrod (*Solidago canadensis*), Canada Brome (*Bromus inermis*), Kentucky Blue Grass (*Poa pratensis*), Canada Blue grass (*Poa compressa*), and the occasional infestation of the introduced Dog-strangling Vine (*Vincetoxicum rossicum*). On moist sites, Yellow trout-lily (*Erythronium americanum*), Field Horsetail (*Equisetum arvense*), Zig-zag Goldenrod (*Solidago flexicaulis*), and Bulblet Fern (*Cystopteris bulbifera*) can also be common.

Significant species: the regionally rare Riverbank Wild Rye (*Elymus riparius*).

34. Deciduous Hedgerow
35. Conifer and Mixed Hedgerow

Many of the cultivated fields in the upper half of the park are separated by narrow hedgerows. Wider hedgerows occur along unopened road allowances south of the terminus of Littles Road, and along the 5th concession line between Littles and Reesor Roads. On this concession line there is still evidence of an old log corduroy road.

Most of the narrow hedgerows consist of planted Sugar Maple (*Acer saccharum*) (CT 34) or, occasionally, planted Norway Spruce (*Picea abies*) and White Cedar (*Thuja occidentalis*) (CT 35).

Other hedgerows appear to be naturally regenerating with deciduous trees of Green Ash (*Fraxinus pennsylvanica*), White Elm (*Ulmus americana*), White Ash (*Fraxinus americana*), Bur Oak (*Quercus macrocarpa*), White Birch (*Betula papyrifera*), and Sugar Maple (i.e hedgerows along Littles Road). There are also a few mixed hedgerows of White Cedar, Black Cherry (*Prunus serotina*), White Ash, and Apple (*Malus domestica*) (i.e hedgerow on Meadowvale Road north of Little Rouge Creek).

The hedgerow on the 5th concession line supports an admixture of naturally regenerating White Ash, Green ash, Trembling Aspen (*Populus tremuloides*), Basswood (*Tilia americana*), White Elm, and Silver Maple (*Acer saccharinum*). The unopened road allowance south of Littles Road contains a forest of Basswood - Sugar Maple - White Ash - Bur Oak - Apple.

36. Deciduous Plantation
37. Conifer and Mixed Plantation

Small plantations occur throughout the park. The only large plantation is located on the uplands west of Little Rouge Creek and north of the CPR line.

Most commonly planted were such conifer trees as White Pine (*Pinus strobus*), Red Pine (*P. resinosa*), Scots Pine (*P. sylvestris*), Norway Spruce (*Picea abies*), and White Spruce (*P. glauca*). Naturally regenerating in gaps within the planted conifers are such deciduous trees as White Ash (*Fraxinus americana*), White Birch (*Betula papyrifera*), Large-toothed Aspen (*Populus grandidentata*), Manitoba Maple (*Acer negundo*), White Elm (*Ulmus americana*), Balsam Poplar (*Populus balsamifera*), and Trembling Aspen (*P. tremuloides*).

Less frequent are deciduous plantings of Black Walnut (*Juglans nigra*), Black Locust (*Robinia pseudoacacia*), Honey Locust (*Gleditsia triacanthos*), Silver Maple (*Acer saccharinum*), and Crack Willow (*Salix Xrubens*).

The conifer plantations have a relatively sparse understorey of Dog-strangling Vine (*Vincetoxicum rossicum*), Poison-ivy (*Rhus radicans*), Wild Lily-of-the-valley (*Maianthemum canadense*), Blue-stem Goldenrod (*Solidago caesia*), Bracken Fern (*Pteridium aquilinum*), and Enchanter's Nightshade (*Circaea lutetiana*). In mixed and deciduous plantations common understorey species include Canada Goldenrod (*Solidago canadensis*), Dog-strangling Vine, Zig-zag Goldenrod (*Solidago flexicaulis*), White Snakeroot (*Eupatorium rugosum*), and Celandine (*Chelidonium majus*).

38. Manmade Pond

- **a. Sedimentation and Stormwater Detention Pond**
- **b. Farmers Pond, Metro Toronto Zoo Ponds, and Gravel Pit Ponds**

Four sedimentation and stormwater detention ponds were constructed in the park during the 1980s. Two are situated on uplands west of the Beare Landfill, while the other two are on the bottomlands of the Rouge River west of Sewells Road. The pond nearest to Sewells Road contains standing water only for brief periods. The ponds with permanent standing water have begun to develop a margin of Narrow-leaved Cattail (*Typha angustifolia*) marsh.

Seven older ponds constructed by farmers to water their crops and livestock are scattered on the uplands north of Finch Avenue. Three ponds have also developed following gravel pit operations, including one on the bottomlands of the Rouge near the Metro Toronto Zoo Weston Station. This pond supports a large cattail (*Typha latifolia*, *T. angustifolia*) marsh. Finally, a long series of ponds were constructed on the Metro Zoo tablelands in the early 1970s.

AGRICULTURAL AND URBAN COMMUNITY TYPES

Agricultural and urban land uses comprise 31% of the park, with cultivated fields the predominant lands.

39. Orchard

Orchards were once common in the park. In the 1950s, there were several in the bottomlands of the Rouge River and Little Rouge Creek, a large orchard on the uplands of today's Metropolitan Toronto Zoo, and others around the intersection of Meadowvale Road and Sheppard Avenue. Today, there only remains an abandoned apple orchard on uplands west of the Rouge River valley and south of Old Finch Avenue, and a second smaller orchard associated with a farm east of Little Rouge Creek valley, south of Steeles Avenue.

40. Cultivated Fields

- **a. Crops of corn, wheat, soyabean, barley, oats, clover, hay, rye and tomato**
- **b. Pasture**
- **c. Tree Nursery**

The northern half of the park, north of Finch Avenue, consists largely of cultivated lands. In 1990, corn was the most common crop, followed in descending order by wheat, soybean, barley and oats, clover, hay, rye and tomatoes (CT 40a). In addition, there is a large vegetable garden on a private holding on the west side of the Rouge River valley, south of Tywn Rivers Drive.

Several pastures (CT 40b) are located northwest and northeast of the intersection of Meadowvale Road and Finch Avenue, around a farmhouse on Reesor Road, and another farmhouse on Steeles Avenue. Several tree and shrub nurseries (CT 40c), operated by the Metropolitan Toronto Parks and Property Department, are located on bottomlands and uplands just north of the Rouge River, west of Sewells Road.

41. Rural and Suburban Residential, Institutional

Suburban homes are restricted to seven small areas in the park: northwest and northeast of the corners of Meadowvale Road and Finch Avenue; the west side of Plug Hat Road just north of Little Rouge Creek; the northwest corner of Finch Avenue and Reesor Road; five homes along Kirkhams Road north of the Rouge River; two homes northwest of the Beare Road landfill; five homes scattered on uplands north of the Rouge River between Sewells and Reesor Roads; and the former Valhalla Estate on the Little Rouge Creek bottomlands east of the Metropolitan Toronto Zoo.

There are also 17 farmhouses and associated farm buildings scattered throughout the northern half of the park. Institutional uses include a school and a small church.

42. Industrial: car wrecking yard

A car wrecking yard is located on the southwest corner of Steeles Avenue and Sewells Road.

43. Recreational

- **a. Metropolitan Toronto Zoo**
- **b. Cedarbrae Golf Course**
- **c. Glen Rouge and Cedarbrae Campgrounds**
- **d. Parking Lot**
- **e. Manicured Parkland**
- **f. Public Bathing Beach**

Recreational lands are scattered throughout the park. The largest area is the Metropolitan Toronto Zoo (CT 42a). Facilities, for the most part, are found in the uplands, however, there are four large animal paddocks in the ANSI portion of the Rouge River Valley. Forests within these paddocks have been degraded by intensive grazing and browsing.

The Cedarbrae Golf Course (CT 42b) has converted 1.3 km of the Rouge River valley south of Steeles Avenue to fairways. Small remnant natural areas remain on the valley slopes and are scattered on the bottomlands.

Two campgrounds in the study area are situated on the west side of the Rouge River north of Highway 2 (Glen Rouge Campground operated by the Metro Toronto Parks Department), and west of Little Rouge Creek south of Steeles Avenue (Cedarbrae Campground, leased to a private firm on lands owned by the Metropolitan Toronto and Region Conservation Authority).

Two large paved parking lots, a gravel parking lot and a grassy one service the Metropolitan Toronto Zoo (CT 42c). There are also smaller parking lots at the mouth of the Rouge River (built over a cattail marsh and graminoid meadow marsh), off Highway 2 on the west side of the Rouge River, on Tywn Rivers Drive along Little Rouge Creek, next to the Finch Avenue 'bailey bridge' over the Rouge River, and the northeast corner of Sewells Road and Finch Avenue.

Manicured parkland (CT 42e) is restricted to a few small lawns near the Rouge River mouth, on Tywn Rivers Drive along Little Rouge Creek (a 30 meter square lawn around a homestead site), around the intersection of Sewells Road and Finch Avenue, and the entrance to the park's two campgrounds.

Along Lake Ontario, west of the Rouge River mouth, there is a 0.75 km stretch of public bathing beach (CT 40f).

44. Refuse and Compost Heaps, Fill

Large refuse and compost heaps in the Rouge River valley are associated with the Metro Parks' tree nurseries west of Sewells Road. Fill has also recently been dumped on the floodplain in the Rouge River valley just west of Kirkhams Road.

iii) FLORA AND FLORISTICS

The Rouge Valley Park is located near the northeastern limits of the Carolinian life zone, or deciduous forest region (site region 7). The park extends from the warmer Lake Ontario shoreline northward towards cooler interior sites. The complexity of slope aspects and soil conditions in the park's valleylands are reflected in a high diversity of microclimates and vegetation communities.

These factors contribute to a diverse flora, with a majority of its native species common to the northern parts of the Carolinian zone and the Great Lakes deciduous forests in general. Numerous Carolinian species, however, add a southern character to parts of the park. Overall, the Park sustains 531 native species (543 taxa) and 231 introduced species (239 taxa), an exceptional diversity for a suburban area in southern Ontario (Appendix A).

By comparison with other natural areas near Lake Ontario in site district 7-4 (Hanna 1984), Bronte Creek Provincial Park, a valleyland park of 683 ha, and with a valleyland nature reserve zone (174 ha), supports 438 native species and 165 introduced species (House and Carleton 1988). Rattray Marsh, the 40 ha natural area on Lake Ontario, has a documented flora of about 450 species (Macdonald, pers. comm.). These are the two most comparable natural areas in the site district; however, the Rouge Valley Park includes both valleylands and lakeshore marsh.

Historically, there is little information available on the past flora of the park. The only species found in a search of the University of Toronto/Royal Ontario Museum herbaria (TRT) are three specimens by Montgomery Wilkes from "near Rosebank", a community on the east side of the Rouge River near Lake Ontario. They include two dry open woodland species, Pale Vetchling (*Lathyrus ochroleucus*) and Rock-cress (*Arabis hirsuta*), and the aquatic Northern Wild-rice (*Zizania palustris*), collected in 1903 and 1900. In 1819, the botanist, John Goldie described a whole hillside covered in Hairy Beard-tongue (*Penstemon hirsutus*) on slopes along Highway 2. The Rock-cress has not been refound, and is probably extirpated from the park. The other three species are still present in the park, but are now very rare, suggesting a decline in their numbers since the 1800s and early 1900s.

More recently, botanical surveys were carried out from 1973 to 1980 (Riley 1978, Wainio *et al.* 1973, Kaiser and Copeland 1974, Riley *et al.* 1980). Seven species noted in these surveys were not refound during the present 1988 to 1991 survey, including Northern Water-milfoil (*Myriophyllum exalbescens*), Black Willow (*Salix nigra*), Lance-leaved Figwort (*Scrophularia lanceolata*), Smooth Rock-cress (*Arabis laevigata*), a hawthorn (*Crategus flabellata*), Pale Vetchling (*Lathyrus ochroleucus*), and an evening-primrose (*Oenothera oakesiana*). The populations of these species may now have been extirpated from the park, or the populations numbers remain extremely low.

Significant Flora

The park is noteworthy for supporting one of the region's largest assemblages of rare flora (Table 4, Map 4). Five species are considered nationally and provincially rare (Argus and Pryer 1990, Argus *et al.* 1982-1987). Another species, Bushy Cinquefoil (*Potentilla paradoxa*) is provincially rare, but not nationally rare.

Ninety-two species are considered regionally rare, being known from five or less post-1925 sites in the Regional Municipalities of Metropolitan Toronto and York, formerly York County (Varga *et al.* 1986). Thirty-six of these species are rare in site district 7-4, encompassing a larger area which includes much of the Regional Municipalities of Peel, Halton, York, and Metropolitan Toronto (a species has to be rare in each of the regional municipalities (Webber 1984, Crins 1986, Varga *et al.* 1986, Riley 1989). Fifteen of these species are also rare in the even larger administrative unit of the Ministry of Natural Resources' Central Region (Riley 1989) (Table 4).

Table 4. Significant vascular plants of the Rouge Valley Park

Species	No. of Sites in York & Metro Toronto[1]	Rare in Site District 7-4[2]	Rare in MNR Central Region[3]	Theme Areas[4]
Nationally and Provincially Rare (Argus & Pryer 1990; Argus *et al.* 1982-87)				
Bidens discoidea (Small Beggar-ticks)	*4	•		1
Crataegus corusca (=*C. hillii*) (Hawthorn)	3	•	•	2,9
Panax quinquefolius (American Ginseng)	6	•		2,4
Scirpus verecundus (Shy Bulrush)	*0	•	•	1,2
Solidago arguta (Sharp-leaved Goldenrod)	2	•	•	2
Provincially Rare (Argus *et al.* 1982-87)				
Potentilla paradoxa (Bushy Cinquefoil)	*4	•	•	1
Regionally Rare (A species is considered regionally rare if it occurs at five or less post-1925 sites in the Regional Municipalities of York and Metropolitan Toronto (Varga *et al.* 1986).)				
Acorus calamus (Sweet Flag)	4	•		1
Agalinis tenuifolia (Slender Gerardia)	4	•	•	1,3-7,9
Agrimonia pubescens (Hairy Agrimony)	*1	•	•	2
Agropyron trachycaulum (Slender Wheat Grass)	1	•		2
Angelica atropurpurea (Angelica)	2			1-4,6,7
Arabis canadensis (Sicklepod)	1			2,3
Arabis laevigata (Smooth Rock-cress)	3			1
Asclepias exaltata (Poke Milkweed)	4			2
Aster pilosus var. *pilosus* (Aster)	4			3,6
Astragalus canadensis (Canada Milk-vetch)	1	•	•	2
Brachyelytrum erectum (Bearded Shorthusk)	5	•		2,3,7
Bromus pubescens (Canada Brome)	1			2
Cakile edentula var. *lacustris* (Sea-rocket)	*4	•	•	1
Cardamine bulbosa (Spring Cress)	4			5,9
Carex alopecoidea (Sedge)	2			3
C. amphibola (Sedge)	1	•		7
C. cephaloidea (Sedge)	2	•		1,2,5,6
C. cephalophora (Sedge)	2			2,5
C. digitalis (Sedge)	1			2,5
C. flava (Sedge)	4			4,6
C. foenea (Sedge)	4			2
C. hitchcockiana (Sedge)	4			5,9
C. laevivaginata (Sedge)	4			5,6
C. rugosperma (Sedge)	5			2
C. tuckermanii (Sedge)	5			5
C. viridula (Sedge)	2			4
C. woodii (Sedge)	3			5
Crataegus aboriginum (Hawthorn)	2	•		2
C. flabellata (Hawthorn)	3	•		2
C. holmesiana (Hawthorn)	3			2,9
C. pringlei (Hawthorn)	3			2
Cyperus engelmannii (Engelmann's Nut-grass)	4	•	•	1
C. lupulinus (Nut-grass)	3			2
C. strigosus (Nut-grass)	2			2
Desmodium nudiflorum (Tick-trefoil)	4			2

Table 4. (continued)

Species	No. of Sites in York & Metro Toronto[1]	Rare in Site District 7-4[2]	Rare in MNR Central Region[3]	Theme Areas[4]
Dryopteris goldiana (Goldie's Fern)	5			5,8
Eleocharis intermedia (Spike-rush)	1			1
Elymus riparius (Riverbank Wild Rye)	4			1,2,4,6
Equisetum Xnelsonii (Nelson's Horsetail)	*1	•	•	1
Erigeron pulchellus (Robin's-plantain)	2	•		1,2
Euphorbia polygonifolia (Seaside Spurge)	*3	•	•	1
Galium circaezans (Wild Licorice)	2			2
Gentiana andrewsii (Closed Gentian)	3	•	•	2,3,4
Gentiana crinita (Fringed Gentian)	4	•	•	2,3,5
Glyceria septentrionalis (Eastern Manna Grass)	3			5
Hackelia deflexa var. *americana* (Stick Seed)	1			2
Helianthus decapetalus (Thin-leaved Sunflower)	3	•	•	2
Heteranthera dubia (Water Star-grass)	1			1
Hydrophyllum canadense (Canada Waterleaf)	5			4,5,8
Hypericum punctatum (Spotted St. John's-wort)	1			2
Juglans nigra (Black Walnut)	1			4,5,6,7
Juncus balticus (Baltic Rush)	4	•		1
Juniperus virginiana (Red Cedar)	2			2
Lathyrus ochroleucus (Pale Vetchling)	*1	•		1
Leersia virginica (White Grass)	3			1,2
Lindernia dubia (False Pimpernel)	3			1
Lonicera hirsuta (Hairy Honeysuckle)	4			2
Ludwigia palustris (False Loosestrife)	3			1
Luzula multiflora (Wood Rush)	2			2
Menispermum canadense (Moonseed)	3			2,5,9
Monotropa hypopithys (Pinesap)	*5			2
Muhlenbergia frondosa (Wire-stemmed Muhly Grass)	4	•	•	2
Myriophyllum exalbescens (Northern Water-milfoil)	4	•		1
M. verticillatum (Green Water-milfoil)	2	•	•	1
Oenothera oakesiana (Evening-primrose)	2	•	•	1
Oryzopsis racemosa (Mountain-rice)	2			2,3,5
Panicum columbianum (Panic Grass)	4	•		2
P. latifolium (Broad-leaved Panic Grass)	5			2
P. linearifolium (Narrow-leaved Panic Grass)	2			2,3
P. xanthophysum (Panic Grass)	2	•		2
Penstemon hirsutus (Beard-tongue)	3			1,2
Pilea fontana (Clearweed)	4	•	•	1,2,6
Pinus resinosa (Red Pine)	4			2,5
Platanus occidentalis (Sycamore)	3			4,5
Polygala senega (Seneca-snakeroot)	*1			2
Polygonum punctatum (Smartweed)	3			1
Polypodium virginianum (Common Polypody)	4			2,5
Ranunculus longirostris (White Water-crowfoot)	4			1
Rhus radicans ssp. *radicans* (Climbing Poison-ivy)	3			1,2,5,9
Rosa palustris (Swamp Rose)	*4	•		1
Sagittaria cuneata (Arrowhead)	3	•		1
Salix nigra (Black Willow)	3			1

Table 4. (continued)

Species	No. of Sites in York & Metro Toronto[1]	Rare in Site District 7-4[2]	Rare in MNR Central Region[3]	Theme Areas[4]
Scirpus fluviatilis (River Bulrush)	*5			1
Scirpus pendulus (Pendant Bulrush)	*2			2
Scrophularia lanceolata (Lance-leaved Figwort)	1	•		2
Solidago bicolor (White Goldenrod)	*5	•	•	2
Spiranthes lucida (Shining Ladies'-tresses)	1			3
Sporobolus vaginiflorus (Ensheathed Dropseed)	3			9
Taenidia integerrima (Yellow Pimpernel)	3			1,2
Vaccinium pallidum (Early Sweet Blueberry)	3			2
Vallisneria americana (Tape Grass)	2	•		1
Zizania palustris var. *palustris* (Northern Wild-rice)	3	•		1
Locally Rare and Restricted to a Few Sites in the Rouge Valley Park (A species is considered locally rare if it occurs at 3 or less post-1950 sites in the Regional Municipality of Metropolitan Toronto.)				
Abies balsamea (Balsam Fir)				2,7
Alopecurus aequalis (Short-awned Foxtail)				1,5
Athyrium thelypterioides (Silvery Glade Fern)				5,8
Calystegia spithamea (Low Bindweed)				2,4
Carex hirtifolia (Sedge)				2,5,6,7,9
Carex muhlenbergii (Sedge)				2
Carex sprengellii (Sedge)				5,9
Epilobium leptophyllum (Willowherb)				3,4,5
Galearis spectabilis (Showy Orchis)				5
Galium trifidum var. *trifidum* (Bedstraw)				1,5
Hypericum ascyron (Great St. John's-wort)				1
Ilex verticillata (Winterberry)				5
Lycopodium dendroideum (Round-branched Ground-pine)				2
Lycopodium digitatum (Crowfoot Clubmoss)				2
Medeola virginiana (Indian Cucumber-root)				2
Pyrola asarifolia (Pink Pyrola)				2
Salix pedicellaris (Bog Willow)				1
Solidago hispida (Hairy Goldenrod)				2
Sparganium chlorocarpum (Green-fruited Bur-reed)				1
Vaccinium angustifolium (Lowbush Blueberry)				2
Verbena stricta (Hoary Vervain)				2
Viburnum alnifolium (Hobblebush)				2
Viola selkirkii (Great-spurred Violet)				2

Legend:

[1] Based on Varga *et al.* 1986. The asterisk (*) indicates that the species only occurs in the portion of the study area in the Regional Municipality of Durham.

[2] Species considered rare in site district 7-4 are rare in the Regional Municipalities of Peel, Halton, York and Metropolitan Toronto (Riley 1989, Webber 1984).

[3] Species considered rare in MNR Central Region are rare in all countries or regional municipalities in which they occur in Central Region (Riley 1989).

[4] Refer Chapter III.iii, Fig. 39.

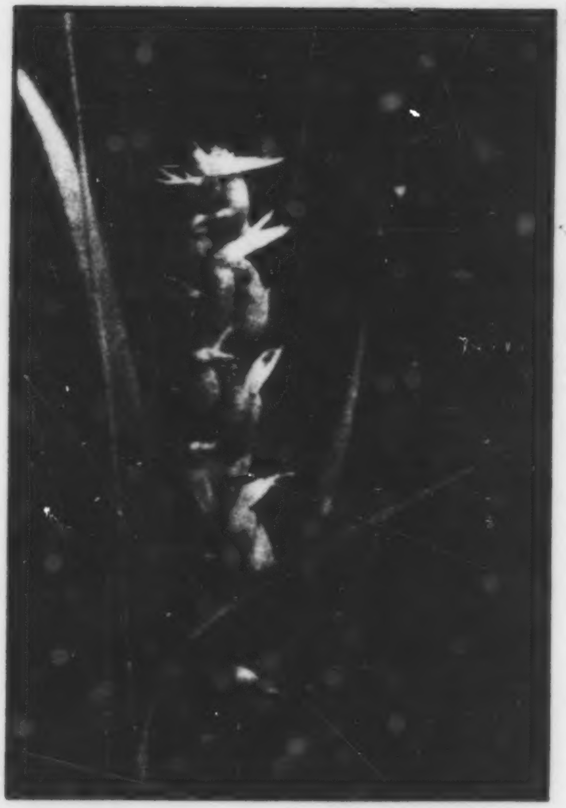


Figure 22. Shining Ladies'-tresses (*Spiranthes lucida*), a rare orchid of horsetail meadows along Little Rouge Creek, found at only this and a nearby location within 50 km of Toronto (JLR 1991).

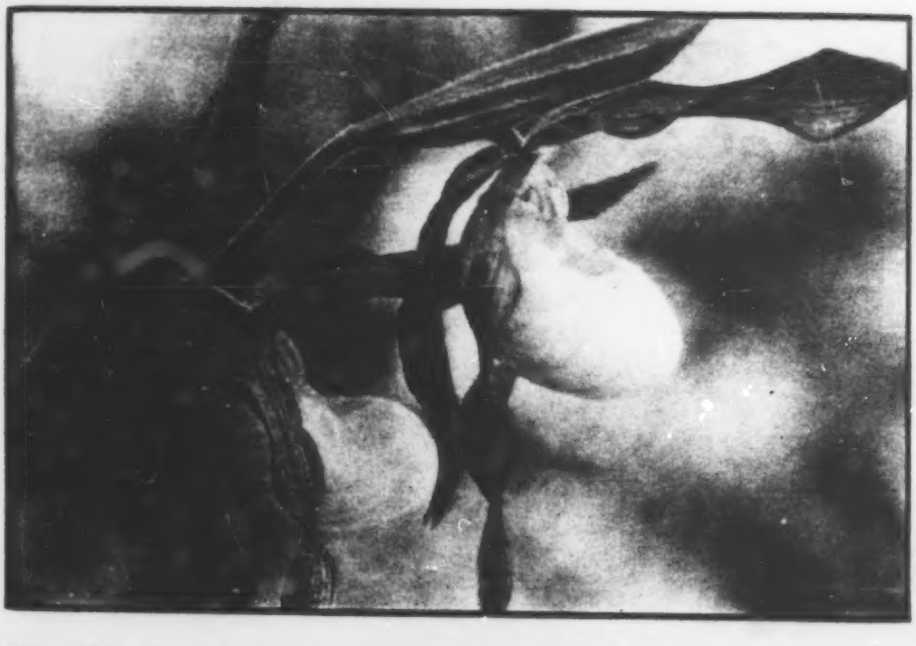


Figure 23. Metropolitan Toronto's largest populations of Large Yellow Lady's-slippers (*Cypripedium calceolus* var. *pubescens*) occur on the steep forest slopes of the valley (JLR 1980).

Twenty-three other species are considered to be locally rare, in this case restricted to a few sites in the park (Map 4). A species is considered locally rare if it occurs at three or less post-1950 sites in the Regional Municipality of Metropolitan Toronto.

Habitat preferences of significant flora

The forty-two most significant rarities in the park are restricted to relatively few communities. (These rarities include the six nationally or provincially rare species, and the thirty-six regionally rare species that are rare in MNR's Central Region or in site district 7-4).

One third of these rare species are found only in wetlands, particularly the Variegated Horsetail meadows along the Rouge River and Little Rouge Creek (CT 5c). Here one finds such rarities as Slender gerardia (*Agalinus tenuifolia*), a sedge (*Carex viridula*), Fringed Gentian (*Gentiana crinita*), Closed Gentian (*Gentiana andrewsii*), and Shining Ladies'-tresses (*Spiranthes lucida*). Rarities are also concentrated in the open water submerged and floating aquatics (CT 2) in the lakeshore marsh, including Green Water-milfoil (*Myriophyllum verticillatum*), Northern Water-milfoil (*M. exalbescens*), Tape Grass (*Vallisneria americana*), and Northern Wild-rice (*Zizania palustris*). Both these wetland communities are rare in site district 7-4, and both are highly vulnerable to deteriorating watershed quality. Other rare wetland species include a clearweed (*Pilea fontana*) found in a variety of meadow marshes (CT 5); Swamp Rose (*Rosa palustris*) and Small Beggar-ticks (*Bidens discoidea*) restricted to a Water Arum meadow marsh and adjacent thicket swamp (CT 5h and 6b); and Sweet Flag (*Acorus calamus*) and an arrowhead (*Sagittaria cuneata*) found in cattail and graminoid marsh (CT 3,4 and 5a) in the lakeshore marsh.

Another third of the rare species are restricted to semi-open dry ground habitats, particularly the drier slope and rim forests of Red Oak and White Oak (CT 15 and 21). They include such rarities as Shy Bulrush (*Scirpus verecundus*), Sharp-leaved Goldenrod (*Solidago arguta*), a sedge (*Carex foenea*), Robin's Plantain (*Erigeron pulchellus*), Hairy Agrimony (*Agrimonia pubescens*), Slender Wheat Grass (*Agropyron trachycaulum*), Canada Milk-vetch (*Astragalus canadensis*), Hairy Honeysuckle (*Lonicera hirsuta*), Lance-leaved Figwort (*Scrophularia lanceolata*), Thin-leaved Sunflower (*Helianthus decapetalus*), Wire-stemmed Muhly Grass (*Muhlenbergia frondosa*), panic grasses (*Panicum columbianum, P. xanthophysum*), and Pale Vetchling (*Lathyrus ochroleucus*). These dry, open habitats appear to have become increasingly rare in the park with the suppression of natural ground fires, and the closing of the oak canopy.

Fifteen percent of the rare species are confined to natural Lake Ontario shorelines (CT 28), now a rare habitat type in site district 7-4. They consist of Baltic Rush (*Juncus balticus*), Seaside Spurge (*Euphorbia polygonifolia*), Sea-rocket (*Cakile edentula*), a nut-grass (*Cyperus engelmannii*), Bushy Cinquefoil (*Potentilla paradoxa*), and Nelson's Horsetail (*Equisetum Xnelsonii*).

Twenty percent of the rare species occur in more widespread habitats such as mesic forests, fields and thickets. For example, hawthorns (*Crataegus corusca, C. aboriginum, C. flabellata*), and an evening-primrose (*Oenothera oakesiana*) are found in fields and thickets (CT 30 and 31). In contrast, Bearded Shorthusk (*Brachyelytrum erectum*), American Ginseng (*Panax quinquefolius*) and sedges (*Carex amphibola, C. cephaloidea*) are found largely in mesic deciduous and mixed terrestial woodlands (CT 12,13,17 and 23).

Population size and location of significant flora

A synopsis outlining population size, location, and status is given for each of the six nationally, or provincially rare species, and for the thirty-six most significant regionally rare species.

Nationally and provincially rare

Bidens discoidea Small Beggar-ticks

Restricted to a small meadow marsh and thicket swamp (CT 5h, 6b) in an old river meander on the east side of the Rouge River south of Highway 401. The population numbers in the thousands. Sufficient new locations have been found in southern Ontario that experts now suggest that it should no longer be considered provincially rare. In site district 7-4, however, there are only four stations in York and no records in the municipalities of Peel and Halton.

Crataegus corusca Hawthorn

This hawthorn occurs in several fields and thickets (CT 30b, 31c) in the Rouge River bottomlands south of Tywn Rivers Drive, and on uplands just northeast of the CPR line and Reesor Road. Population size is unknown, but probably numbers in the hundreds. In site district 7-4, it is only known from this station, and one station in Peel.

Panax quinquefolius American Ginseng

There are two populations of American Ginseng, one of 35 plants at the base of a rich Sugar Maple valley slope forest (CT 17b), and another of 31 plants (25 with no mature fruits, and 6 with mature fruits ranging from 1 to 5 fruits per plant with an average of 3 fruits) in a rich bottomland forest of White Cedar and Hemlock (CT 13b). Locations of ginseng populations are not on Map 4 due to its high sensitivity. Although widespread in southern Ontario, American Ginseng has been designated a threatened species by O.M.N.R. Wildlife Branch because its numbers are threatened by harvesting for its presumed medicinal properties (White 1987). In site district 7-4, the park supports the largest known populations in York and Metro Toronto. Ginseng is known from six stations in York, six in Halton and two in Peel.

Potentilla paradoxa Bushy Cinquefoil

The Bushy Cinquefoil is confined in the park to a small section of Lake Ontario shoreline, east of the Rouge River mouth. Populations generally reach a maximum during low lake level years, such as in 1988, when about one hundred plants occurred on the moist beach strand (CT 28b), particularly on a recently formed sand spit. Numbers plummeted to about a dozen plants during the higher lake levels in 1990, when the sand spit washed away. Bushy Cinquefoil is restricted in Ontario to the shorelines of the lower Great Lakes. In site district 7-4 it is known from eight shoreline locations; the Toronto Islands, Leslie Street Spit, Cherry Beach and the Rouge in Metro Toronto, and four stations in Peel. It is considered to be provincially, but not nationally rare, because of western Canadian populations.

Scirpus verecundus Shy Bulrush

This vernal sedge is restricted to two populations on the east side of the Rouge River valley, just north and south of Highway 401. The northern population consists of a small clump on the edge of a Big Bluestem (*Andropogon gerardii*) clearing (CT 30c), while the southern population has several hundred clumps on the dry mesic southfacing valley slopes of a Red Oak - White Oak - Sugar Maple forest (CT 15a) (Crins 1985). Shy Bulrush has been designated a rare species by O.M.N.R. Wildlife Branch. It is known from only two stations in Canada, in the Rouge and in Hamilton on the north and south shores of Dundas Marsh (Crins 1985).

Solidago arguta Sharp-leaved Goldenrod

This goldenrod is restricted to a small population of three flowering plants and several vegetative rosettes on the valley rim and uppermost slope of the interfluvial tableland separating the park's two major river valleys. It is situated under a semi-closed forest canopy of Red Oak and White Oak (CT 21), and is associated with other rarities including a panic grass (*Panicum xanthophysum*) and a sedge (*Carex foenea*). It is scattered throughout southern Ontario, with only two stations in site district 7-4, the second on the Oak Ridges Moraine in York.

Regionally rare

Acorus calamus Sweet Flag
There are several thousand stems covering about 30 metres square in the northeast corner of the lakeshore marsh. Sweet Flag is associated with sedge marsh (CT 4a) and cattail marsh (CT 3).

Agalinus tenuifolia Slender Gerardia
This showy herb is common in many of the Variegated Horsetail (*Equisetum variegatum*) meadow marshes (CT 5c) along Little Rouge Creek just east of Meadowvale Road and north of Twyn Rivers Drive, on the Rouge River west of Sewells Road, and on three former gravel pits on uplands. A number of the Variegated Horsetail meadows in the valleys have also developed on lands mined for river gravels in the 1950s. In site district 7-4, Slender Gerardia is absent from Peel, Halton,and is known from only four stations in York and Metro Toronto.

Agrimonia pubescens Hairy Agrimony
This inconspicuous agrimony is confined to a Staghorn Sumac (*Rhus typhina*) thicket (CT 31b) and a hawthorn - Nannyberry (*Viburnum lentago*) thicket (CT 31c), on a Little Rouge Creek valley rim and upper slope, just north of Highway 2. The population numbers about 18 plants. Elsewhere in site district 7-4, Hairy Agrimonia is only known from Toronto's High Park.

Agropyron trachycaulum Slender Wheat Grass
This northern grass is restricted to two small populations on valley rims of the interfluvial tableland, north and south of Twyn Rivers Drive. The 30 stems occur under a semi-closed canopy of Red Oak - White Oak (CT 21), and Red Oak - Sugar Maple - Red Maple (CT 22a). Elsewhere in site district 7-4 it is known from only a few stations in Halton and Peel.

Astragalus canadensis Canada Milk-vetch
This milk-vetch is known from one small patch of about 100 plants on the interfluvial tableland just south of Tywn Rivers Drive. The habitat is a dry Red Oak and White Oak forest (CT 21).

Brachyelytrum erectum Bearded Shorthusk
There are four small populations in dry to mesic valley slope forests (CT 15a and 17b) and dry rim forest (CT 21) east of Little Rouge Creek and south of Twyn Rivers Drive; and one small population and four sizeable populations (several hundred stems) in Sugar Maple high terrace forests (CT 23b) on Little Rouge Creek, just south of Steeles Avenue, and east of the Valhalla Estate, respectively.

Cakile edentula var. *lacustris* Great Lakes Sea-rocket
An annual of the Great Lakes shorelines, it is restricted in the park to moist beach strands (CT 28b) on the east side of the Rouge River mouth. Numbers have varied from several dozen plants in the low lake level year of 1988 to a few plants during the higher lake levels of 1990. This variety is a Great Lakes shoreline endemic.

Carex amphibola Sedge
Eight populations, with a total of about 100 clumps, are found on the Little Rouge Creek bottomlands south of Steeles Avenue, in mixed and deciduous forests (CT 12e, 13c, 23b).

Carex cephaloidea Sedge
Three small populations of this sedge occur in a dry mesic Red Oak tableland rim forest (CT 22a) west of Sewells Road, in a mesic Sugar Maple high terrace forest (CT 23b) on the Rouge River north of Finch Avenue, and in the moist bottomlands around the lakeshore marsh (Copeland, 1974, TRT).

Carex foenea Sedge
A small patch of this sedge is found in a semi-closed forest of Red Oak and White Oak (CT 21), situated on the interfluvial tableland north of Highway 2.

Carex viridula Sedge

Several dozen stems occur in a Variegated Horsetail meadow (CT 5c) that has developed in a former gravel pit on the uplands northwest of the Sheppard Avenue and Meadowvale Road intersection. In site district 7-4, the only other location for this wetland sedge is on the Toronto Islands.

Crataegus aboriginum Hawthorn

About a dozen shrubs occur in a bottomland clearing on the east side of the Rouge River north of Highway 2.

Crataegus flabellata Hawthorn

This hawthorn was collected by Jeff Kaiser and Peter Copeland in 1974 (MP) on the west side of the Rouge River valley, just north of Highway 2. It was not refound during the current survey.

Cyperus engelmannii Nut-grass

This annual is restricted in the park to moist beach strands (CT 28b) east of the Rouge River mouth, and to exposed mudflats (CT 28d) in the lower portion of the lakeshore marsh. During the survey, population numbers peaked in the low lake level year of 1988, when several hundred plants were present in late summer.

Equisetum Xnelsonii Nelson's Horsetail

This hybrid between *Equisetum variegatum* and *E. laevigatum* is confined to a Lake Ontario shoreline meadow (CT 28c) on the east side of the Rouge River mouth. Thousands of stems cover a meadow of 70 metres square. The Toronto Islands are the only other location for this horsetail in site district 7-4.

Euphorbia polygonifolia Seaside Spurge

This native spurge of Great Lakes shorelines is restricted in the park to moist beach strands (CT 28b) on the east side of the Rouge River mouth. There were about 20 plants during the low lake level year of 1988, and few plants during the higher water of 1990. In site district 7-4, its only other locations are Burlington Beach in Halton, and the Toronto Islands and Leslie Street Spit in Metro Toronto.

Gentiana andrewsii Closed Gentian

Three small colonies exist in the park: two with only a few plants each on Morningside Creek and along Little Rouge Creek just east of the parking lot on Tywn Rivers Drive, and a third colony of 35 plants on the east side of Little Rouge Creek opposite the Valhalla Estate. All colonies occur in Variegated Horsetail (*Equisetum variegatum*) meadows (CT 5c). In site district 7-4, Closed Gentian is only known from two other locations in Metro Toronto, and one in Halton.

Gentiana crinita Fringed Gentian

There are several hundred plants of Fringed Gentian on the west side of the Rouge River south of Finch Avenue, and 51 plants on the east side of Little Rouge Creek downstream of the Beare landfill access road. Both colonies are found in Variegated Horsetail (*Equisetum variegatum*) meadows (CT 5c). A third colony of about ten plants is located in a wet depression on the hydroline south of the Beare landfill. In site district 7-4, it is known from three other stations in Metro Toronto and two stations in Halton.

Helianthus decapetalus Thin-leaved Sunflower

This sunflower is known from a small clump of 20 stems on a dry mesic Red Oak and Sugar Maple valley slope forest (CT 16a), near the edge of a high bluff. The site is located on the west side of Little Rouge Creek, just north of Tywn Rivers Drive. Elsewhere in site district 7-4, it is only known from several stations in Peel.

Juncus balticus Baltic Rush

This rush is confined to a small meadow marsh (CT 5f) along Highway 2, and the Lake Ontario shore (CT 28b, 28c), east of the Rouge River mouth. Dozens of stems occur in the meadow marsh and thousands in the shoreline wet meadow, scattered over 70 square metres.

Lathyrus ochroleucus Pale Vetchling

Pale Vetchling was last found in 1973 by Riley (TRT) on a dry Red Oak - White Oak - White Pine valley slope forest (CT 15b), east of the Rouge River and south of Highway 401. Population size is unknown, however, it was not found in the current survey suggesting that numbers are very low, or it may even be extirpated. In site district 7-4, the Rouge supports the only known location for this species.

Lonicera hirsuta Hairy Honeysuckle

Several shrubs are found in an interfluvial tableland forest of Red Oak - Sugar Maple - Red Maple (CT 22a), just north of Twyn Rivers Drive.

Muhlenbergia frondosa Wire-stemmed Muhly Grass

There is a small population of several dozen stems in a dry mesic valley slope forest of Red Oak, White Oak and Sugar Maple (CT 15a), on the east side of the Rouge River, north of Highway 2.

Myriophyllum exalbescens Northern Water-milfoil

This Water-milfoil was sighted in 1973 along a transect line through the open water submerged and floating aquatic community (CT 2) of the lakeshore marsh (Wainio *et al.* 1973). It was not refound in the current survey, suggesting it has been reduced to very low numbers, or extirpated.

Myriophyllum verticillatum Green Water-milfoil

This aquatic is restricted to a channel in the lakeshore marsh that was probably made in the 1920s. In one of the few areas in the marsh were the water is relatively clear, the Water-milfoil forms a dense submergent mat along 200 m of the channel. Elsewhere in site district 7-4, it is only known from 2 stations in Peel, and one station in York along the Lake Simcoe shores.

Oenothera oakesiana Evening-primrose

This evening-primrose was last found in 1973 by Riley (TRT) on the former Island Road bottomland cottage community, now regenerating to fields and Staghorn Sumac (*Rhus typhina*) thickets (CT 30b, 31b). It is mainly a species of Great Lakes shores, occasionally inland in clearings or other disturbed sites (Voss 1985). Elsewhere in site district 7-4, it is only known from the Toronto Islands. Its rarity, however, may be largely due to taxomonic difficulties in this group; *Oenothera oakesiana* has often been treated as a variety of the more common *Oenothera parviflora* in the past (Voss 1985).

Panicum columbianum Panic Grass

Several dozen plants occur in small open slippage areas on the steep valley slopes of a successional forest of White Birch - White Ash - Sugar Maple (CT 32a). It is associated with such rarities as Broadleaf Panic Grass (*Panicum latifolium*), Hairy Beard-tongue (*Penstemon hirsutus*), and Narrow-leaved Panic Grass (*Panicum linearifolium*). Elsewhere in site district 7-4, Panicum columbianum is known from two stations in York and Metropolitan Toronto.

Panicum xanthophysum Panic Grass

Two populations, with several dozen stems, occur on valley rims of the interfluvial tableland, north and south of Twyn Rivers Drive and under a semi-closed canopy of Red Oak and White Oak (CT 21). Elsewhere in site district 7-4, it is known from one station in Halton and from Toronto's High Park.

Pilea fontana Clearweed

This clearweed is known from 4 scattered locations in meadow marshes (CT 5g, 5h), in Speckled Alder (*Alnus rugosa*) thicket swamp (CT 6b), in a semi-open White Cedar seepage slope forest (CT 10), and in small meadow marsh openings in deciduous bottomland forests (CT 12b). Numbers at each site vary from several hundred, to tens of thousands in the meadow marsh and thicket swamp east of the Rouge River south of Highway 401. Although considered rare in site district 7-4, it has probably been overlooked due to its late fruiting in September, its small size, and its similarity to the common *Pilea pumila* (many taxonomists consider *Pilea fontana* part of this species) (Voss 1985).

Rosa palustris Swamp Rose

Several shrubs occur in the midst of a Water Arum (*Calla palustris*) meadow marsh (CT 5h) and thicket swamp (CT 6b) in a former river meander east of the Rouge River and south of Highway 401. In site district 7-4 this northern shrub is only known from two stations in Halton; three stations in York, all in its northern half, are outside of the site district.

Sagittaria cuneata Arrowhead

This common arrowhead is located throughout the lakeshore marsh (CT 2,3 and 4), and the small meadow marsh and thicket swamp to the north (CT 5h and 6b). Elsewhere in site district 7-4, it is known from only one station in Peel and two in York.

Scrophularia lanceolata Lance-leaved Figwort

It was last found in 1974 by Copeland (MP), on a Red Oak - White Oak interfluvial tableland forest just south of Twyn Rivers Drive. Its absence from the current survey suggests that numbers are very low. Elsewhere in site district 7-4, it is known from a few stations in Peel.

Spiranthes lucida Shining Ladies'-tresses

This beautiful orchid is restricted to calcareous Variegated Horsetail meadows (CT 5c) along Little Rouge Creek. The location is not shown on Map 4 due to its high sensitivity. Numbers at the main population have varied over the years, with 45 plants in 1976, 178 in 1977, 206 in 1978, 50 in 1979, 11 in 1980, and 9 in 1991. There were also an additional 7 plants and one plant in two nearby downstream populations in 1980. Similar trends have been observed in the Duffin Creek population, with 124 plants in 1978, 69 in 1979, and 25 in 1980. It has commonly been reported that known colonies of orchids persist for a period of years and then dwindle or disappear (Case 1987). A possible sequence on the Rouge may consist of Shining Ladies'-tresses colonizing a riverine meadow scrapped clear by floods or ice flows. Numbers reach a peak and then decline as other vegetation spreads and shades out the orchids. In site District 7-4, the only other station is found in Halton.

Vallisneria americana Tape Grass

During the high lake levels of 1973, Tape Grass was relatively widespread in the open water submerged aquatic community (CT 2) of the lakeshore marsh. By 1989, Tape Grass had declined to a small population, a few metres square, in the northwest corner of the marsh. Elsewhere in site district 7-4, it is only known from two stations in Halton; in York, a single station occurs on the shores of Lake Simcoe.

Zizania palustris var. *palustris* Northern Wild-rice

Historically, this species likely formed sizeable stands in the lakeshore marsh. Today, there are about 20 plants in open water in a man-made channel in the marsh (CT 2). Northern Wild-rice has completely disappeared from other marshes in site district 7-4. For example, it occurred in the Humber marshes in Toronto, and the Credit River marshes in Peel. The decline is apparently due to deteriorating water quality in Lake Ontario, particularly higher turbidity levels (Crowder and Bristow 1988).

Floristics

The flora of the park is typical of an area in the transition zone between the deciduous forest region (site region 7) of southwestern Ontario, and the mixed or southern deciduous-evergreen region (site region 6) to the north. The deciduous forest region stretches south of a line from Grand Bend on Lake Huron through London to the Rouge Valley Park, containing many plants and animals more typical of areas to the south or west in the United States. Some species are derived from prairie and savannah habitats in the midwest, while others have affinities with the eastern deciduous forest centred in the Carolinas, hence the colloquial name, the Carolinian life zone. The Carolinian life zone contains many of the most endangered habitats in Canada, as exemplified by the fact that it sustains 65% of Ontario's rare plant species (Oldham 1990).

Situated on the northeastern edge of the deciduous forest region, the park is noteworthy for supporting 28 southern species, all but three of which are at the limits of their ranges at the park or in the immediate vicinity of the park (Table 5). These include such typical Carolinian species as Sycamore (*Platanus occidentalis*), Shy Bulrush (*Scirpus verecundus*), Hairy Agrimony (*Agrimonia pubescens*), Canada Brome (*Bromus pubescens*), Smooth Rock-cress (*Arabis laevigata*), and Early Sweet Blueberry (*Vaccinium pallidum*) (Fig. 24). The majority of these southern species are concentrated on sites with warmer microclimates such as dry southfacing valley slopes dominated by oak forests.

More than forty species have northern affinities, with their ranges generally terminating just south of the lower Great Lakes and occasionally south along the Appalachian Mountains (Reznicek and Catling 1989; Table 5). Only two of these species, Balsam Fir (*Abies balsamea*) and Hobblebush (*Viburnum alnifolium*), have their range limits occurring in the park. Balsam Fir is a good example of a boreal species, while Hobblebush is a classic Appalachian species, whose western range just gets into the eastern half of Ontario. Fifteen of these species are restricted in the park to sites with cooler microclimates, such as the northfacing valley slope forests of Hemlock and the mixed White Cedar - Hemlock swamps and seepage slopes. These include the Small Enchanter's Nightshade (*Circaea alpina*), Oak Fern (*Gymnocarpium dryopteris*), sedges (*Carex disperma*, *Carex interior*), Naked Mitrewort (*Mitella nuda*), Rose-twisted Stalk (*Streptopus roseus*), Round-branched Ground-pine (*Lycopodium dendroideum*), Hobblebush, Balsam Fir, Dwarf Raspberry (*Rubus pubescens*), Marsh Pennywort (*Hydrocotyle americana*), and Swamp Red Currant (*Ribes triste*). Another seven species, however, occurs in warmer microsites, on drier knolls and southfacing valley slopes. They include Slender Wheat Grass (*Agropyron trachycaulum*), Hairy Honeysuckle (*Lonicera hirsuta*), a panic grass (*Panicum xanthophysum*), Red Pine (*Pinus resinosa*), Low Bindweed (*Calystegia spithamea*), Hairy Goldenrod (*Solidago hispida*), and Pale Vetchling (*Lathyrus ochroleucus*).

The park also supports 15 species with prairie or savannah affinities, such as Big Bluestem (*Andropogon gerardii*), the sedges (*Carex foenea*, *C. muhlenbergia*), Robin's Plantain (*Erigeron pulchellus*), and Seneca Snakeroot (*Polygala senega*). These species are concentrated in a few prairie-like openings and in dry Red Oak and White Oak forests, especially under semi-open canopies along valley rims. The presence of these prairie species suggests that fire played a role in the park's ecology in the past, and also suggests some First Nations influence. Some of the prairie species occur on a sandy knoll that once supported a sizeable Seneca village in the late 1600s (*Cyperus lupulinus* and *Carex muhlenbergii*). The diversity of prairie and savannah species is not as high as some of the other known sites in site district 7-4. For example, High Park in Toronto has 30 species with prairie and savannah affinities, Bronte Creek Provincial Park in Halton has 23, and Lorne Park Prairie in Peel has 22 species (Varga 1989).

Three species restricted to Great Lakes shorelines are found in the park, just east of the Rouge River mouth. They consist of the endemic Great Lakes Sea-rocket (*Cakile edentula* var. *lacustris*), Seaside Spurge (*Euphorbia polygonifolia*), and Bushy Cinquefoil (*Potentilla paradoxa*). It is postulated that the first two species migrated to the Great Lakes from the Atlantic Coast, after deglaciation, when the brackish Champlain Sea extended up the St. Lawrence and Ottawa valleys (Guire and Voss 1963).

Table 5. **Geographic affinities of selected vascular plants of the Rouge Valley Park**

Species with southern affinities
(Species at the limit of their range in the Rouge Valley Park or immediate vicinity are noted with an asterisk. Species entirely or largely confined to the Carolinian zone or site region 7 are noted with a "C"; Oldham 1990, and other sources.)

* *Acer nigrum*
C * *Agrimonia pubescens*
* *Arabis canadensis*
C * *Arabis laevigata*
* *Asclepias exaltata*
* *Aster azureus*
* *Aster pilosus var pilosus*
C * *Bromus pubescens*
* *Carex amphibola*
* *Carex digitalis*

Carex foenea
* *Carex laeviwaginata*
* *Corylus americana*
(outside study area, but within Rouge Valley Park)
* *Crataegus corusca*
* *Elymus riparius*
* *Hamamelis virginiana*
C * *Juglans nigra*
* *Leersia virginica*

Menispermum canadense
* *Muhlenbergia frondosa*
C * *Platanus occidentalis*
* *Populus deltoides*
C * *Scirpus verecundus*
* *Solidago arguta*
* *Solidago bicolor*
* *Solidago patula*
C * *Vaccinium pallidum*
* *Ulmus rubra*

Species with northern affinities
(Species at the limit of their range in the Rouge Valley Park are noted with an asterisk; Reznicek and Catling 1989, and other sources.)

* *Abies balsamea*
Actaea rubra
Agropyron trachycaulum
Betula papyrifera
Calla palustris
Calystegia spithamea
Carex aurea
Carex disperma
Carex flava
Carex interior
Carex viridula
Circaea alpina
Cornus rugosa
Equisetum scirpioides

Equisetum variegatum
Galium trifidum
Gymnocarpium dryopteris
Hydrocotyle americana
Juncus alpinoarticulatus
Juncus balticus
Lathyrus ochroleucus
Lonicera hirsuta
Lycopodium dendroideum
Mitella nuda
Panicum xanthophysum
Pinus resinosa
Polygala paucifolia
Populus balsamifera

Populus tremuloides
Potentilla anserina
Ribes hirtellum
Ribes triste
Rubus pubescens
Salix pedicellaris
Sambucus pubens
Solidago hispida
Streptopus roseus
Thuja occidentalis
Trientalis borealis
* *Viburnum alnifolium*
Viola selkirkii

Species with prairie and savannah affinities
(Riley 1989)

Andropogon gerardii
Aster azureus
Carex foenea
Carex muhlenbergii
Ceanothus americanus

Comandra umbellata
Cyperus lupulinus
Desmodium canadense
Elymus canadensis
Erigeron pulchellus

Polygala senega
Sporobolus cryptandrus
Sporobolus neglectus
Sporobolus vaginiflorus
Vaccinium pallidum

Great Lakes shoreline species
(Guire and Voss 1963)

Cakile edentula var. lacustris

Euphorbia polygonifolia

Potentilla paradoxa

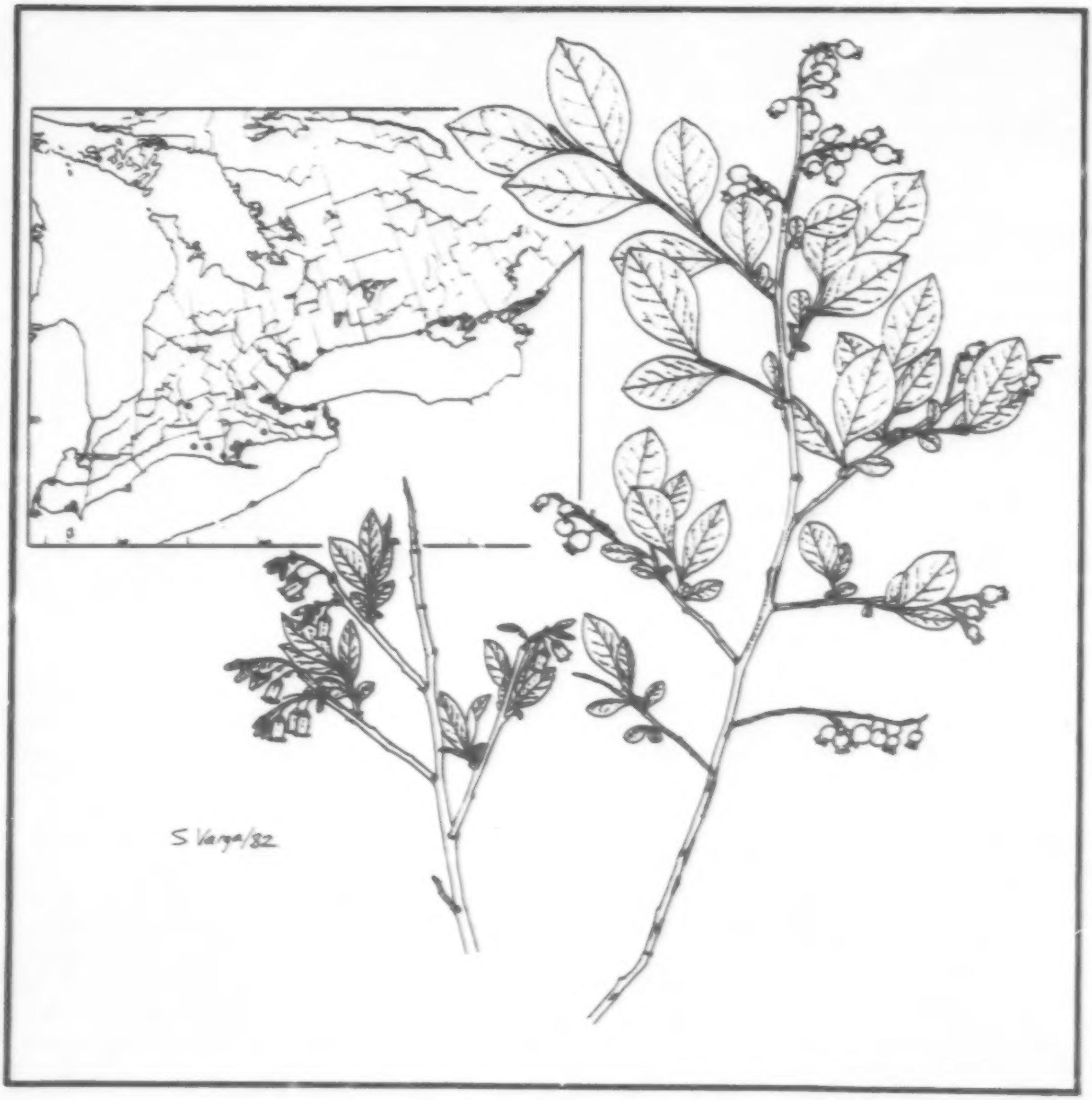


Figure 24. Distribution of Early Sweet Blueberry (*Vaccinium pallidum*), a Carolinian species in Canada.

iv) FAUNA - BIRDS, MAMMALS, FISH, AMPHIBIANS AND REPTILES

BIRDS

At least 253 species of birds have been observed in the Rouge Valley Park or within two kilometres of its boundaries. 225 species have been recorded inside the park. The diversity and high quality of habitats in the Rouge Valley Park is further reflected in the 123 species of breeding avifauna. Nine current or former breeding species are nationally or provincially significant, or are species of concern (Table 6; Map 3).

Recent breeding records include Cooper's Hawk, Least Bittern, Black Tern, Black-crowned Night-Heron and Orchard Oriole, while former breeders include Red-shouldered Hawk (as late as 1985), American Coot (to 1973) and Loggerhead Shrike (to 1966). Carolina Wren may breed at the Rouge, and Great Black-backed Gull and Caspian Tern are non-breeding summer visitors. Nationally Blue-listed Great Blue Heron use the park's wetlands for feeding, and nest in a small colony less than 1 km northeast of the park.

An additional 39 species are considered uncommon to rare in southern York and Durham and/or Metropolitan Toronto during breeding season (Goodwin 1988, Bain and Henshaw 1990, Cadman *et al.* 1988, Fazio pers. comm.) (Table 6; Map 3). Other breeding season species of interest include a total of 9 raptor species, 11 colonial-nesting species, and 10 species which are uncommon, rare or very local in distribution within the park.

In recent decades, there has been considerable research on area-sensitive species of forest interiors (Robbins *et al.* 1989a, Whitcomb *et al.* 1981). A number of U.S. studies document a decline in relative abundance of many bird species of forest interiors in relation to forest fragmentation and decrease in woodlot size (Robbins 1979; Whitcomb *et al.* 1981; Ambuel and Temple 1983; Blake and Karr 1987; De Graaf and Healy 1988; Gibbs and Faaborg 1990; Blake 1991). These trends are particularly notable among neotropical migrants (Robbins 1979; Blake and Karr 1987). Bolger *et al.* (1991) conclude that species extinctions and extirpations are most likely to occur in fragmented habitats.

The Rouge supports breeding populations of at least 16 species considered area-sensitive by Robbins (1979) (Map 3). The highest breeding densities of two of these species, Ovenbird and Scarlet Tanager, occur in the Rouge Valley Park's most extensively forested and undisturbed areas (Fig. 25). Even there, however, the park's total breeding populations of Ovenbird and Scarlet Tanager may be no more than 9 and 12 pairs, respectively.

The Rouge Valley Park is situated at the northern edge of the Carolinian deciduous forest region, and its avifauna includes both species with southern affinities and those with northern affinities found during breeding season (Table 7). Of these eight species with southern affinities, 3 species, Northern Mockingbird, Blue-gray Gnatcatcher (Fig. 26a) and Carolina Wren, occur at the northern limit of their ranges in the park. Three of the nine species with northern affinities, Magnolia Warbler, Black-throated Blue Warbler (Fig. 26b) and Pine Siskin, occur at the southern limit of their breeding ranges in the park.

The Rouge Valley Park also provides valuable breeding habitat for many of southern Ontario's more common and familiar bird species, some of which occur in large numbers. The relative abundance and breeding status of all species in each of the park's 'theme areas' is presented in Table 8. (Refer to Chapter III.iii for descriptions of theme areas.)

Table 6. Significant breeding birds of the Rouge Valley Park

Nationally and provincially rare, threatened "T" or endangered "E" (COSEWIC)

Cooper's Hawk C (Penak 1981)
•T Red-shouldered Hawk C-170, last breeding season sighting 1985 (Risley 1982)
Least Bittern C-1973, still present in breeding season 1990 (Sandilands & Campbell 1987)
Black Tern C (Gerson 1987)
•E Loggerhead Shrike C-1966 (Cadman 1985)

Provincial Species of Concern (Cadman 1990; in addition to the species above)

Black-crowned Night-Heron C-1988
• American Coot C-1973
Carolina Wren O
Orchard Oriole P

Nationally blue-listed (Tate 1986)

Great Blue Heron (breeds within 1 km of park)

Locally Significant

(Rare to uncommon in the Regional Municipalities of Metropolitan Toronto, Durham and southern York during breeding season. Bain and Henshaw 1989, Goodwin 1988, Cadman *et al.* 1987, Fazio, pers. comm, and personal observations.)

▲	GRHE	Green-backed Heron C-1973
•▲	AMBI	American Bittern C-1973
	WODU	Wood Duck C
	ABDU	American Black Duck P
	NOHA	Northern Harrier C-1983
+	OSPR	Osprey S
	RUGR	Ruffed Grouse C
	VIRA	Virginia Rail P
▲	COMO	Common Moorhen C
	AMWO	American Woodcock C-1982
	BBCU	Black-billed Cuckoo C-1982
•	YBCU	Yellow-billed Cuckoo O-last breeding season sighting 1983
	ESOW	Eastern Screech-Owl P
	RTHU	Ruby-throated Hummingbird C
	RHWO	Red-headed Woodpecker C-1983
▲	YBSA	Yellow-bellied Sapsucker C-1983
	PIWO	Pileated Woodpecker C
	ALFL	Alder Flycatcher C
▲	LEFL	Least Flycatcher C
	CLSW	Cliff Swallow C
	RBNU	Red-breasted Nuthatch C
	BRCR	Brown Creeper P
	WIWR	Winter Wren C
•▲	MAWR	Marsh Wren C-1973
+	BGGN	Blue-gray Gnatcatcher C
+	NOMO	Northern Mockingbird O
+	YTVI	Yellow-throated Vireo C-1980s
	CSWA	Chestnut-sided Warbler P
+	BTBW	Black-throated Blue Warbler C-1983
▲	PIWA	Pine Warbler O
▲	BAWW	Black-and-white Warbler P
▲	NOWA	Northern Waterthrush O
	MOWA	Mourning Warbler P
+	CAWA	Canada Warbler O
▲	VESP	Vesper Sparrow C-1983
	GRSP	Grasshopper Sparrow C
▲	WTSP	White-throated Sparrow P
+	PISI	Pine Siskin O

Legend:

+ Locally rare in Metro Toronto, Durham and southern York Regional Municipalities
▲ Rare or uncommon only in Metro Toronto
• Species which have bred within the boundaries of the Rouge Valley Park, but which were not recorded during the breeding season in 1990.
C Confirmed breeding species in the Rouge Valley Park (date when last confirmed breeding if not confirmed in 1990)
P Probable breeding species in the Rouge Valley Park
O Possible breeding species in the Rouge Valley Park

Habitat Preferences for Significant Avifauna

This summary focuses primarily on the more significant breeding birds, and the habitats are described in terms of community types (CT) described in Chapter II.ii).

Wetland Species

The park's wetlands support a number of interesting bird species during breeding season. In the lakefront marsh, the locally significant Blue-winged Teal, Wood Duck and Common Tern, and the nationally rare Caspian Tern and threatened Black Tern make use of the open waters for feeding. At least 20 pairs of Cliff Swallow (locally uncommon) nest under the pedestrian footbridge at the mouth of the Rouge and undoubtedly depend upon the marsh's production of flying insects. The cattail marsh (CT 3) provides breeding habitat for Least Bittern (nationally and provincially rare) and Black Tern, and the locally uncommon Common Moorhen and Virginia Rail. The adjacent meadow marsh of Canada Bluejoint (CT 5a) supports breeding Swamp Sparrow and foraging Black-crowned Night-Heron (species of concern), as well as Virginia Rail. Black-crowned Night-heron, Brown Creeper (locally uncommon), Blue-gray Gnatcatcher (locally rare, Goodwin 1988) and, possibly, Northern Waterthrush breed or have bred in the Crack Willow swamp (CT 7d) adjacent to the lakefront marsh.

The wetlands of the park's interior also provide habitat for locally significant species. The riverine habitats of the Rouge River and Little Rouge Creek (CT 1) provide feeding habitat for American Black Duck and Osprey, as well as several pairs of Belted Kingfisher. The meadow marshes and bottomland thickets support breeding Empidonax flycatchers - Willow Flycatcher in the scattered willows among the Reed Canary Grass (CT 5b), and Alder Flycatcher in a Heartleaf Willow - Sandbar Willow thicket (CT 11) - and American Woodcock, in the Variegated Horsetails (CT 5c). Cutgrass ephemeral ponds (CT 5e) are frequented by Wood Duck, American Black Duck and Blue-winged Teal, as well as more common waterfowl.

The deciduous swamps (CT 7) away from the rivers provide habitat for interesting woodland species. Locally noteworthy in Green Ash - White Ash (CT 7b) swamps are Black-throated Blue Warbler (regionally rare, Riley and Gould 1989) and Ruffed Grouse. Great Horned Owl occurs in a Beech - White Ash - Blue-beech swamp (CT 7g), and Wood Duck in spring-flooded successional Trembling Aspen swamps (CT 7j).

Table 7. Geographic affinities of some of the breeding birds of the Rouge Valley Park.

Species with southern affinities
(Generally breed south of the Canadian Shield in Ontario.)

Common Moorhen
Red-headed Woodpecker
Yellow-billed Cuckoo
Willow Flycatcher
Northern Mockingbird *
Blue-gray Gnatcatcher *
Carolina Wren *
Yellow-throated Vireo

Species with northern affinities
(Generally breed north of the southern edge of the Canadian Shield in Ontario.)

Red-breasted Nuthatch
Winter Wren
Black-and-white Warbler
Magnolia Warbler *
Black-throated Blue Warbler *
Blackburnian Warbler
Canada Warbler
White-throated Sparrow
Pine Siskin *

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* At limit of range.

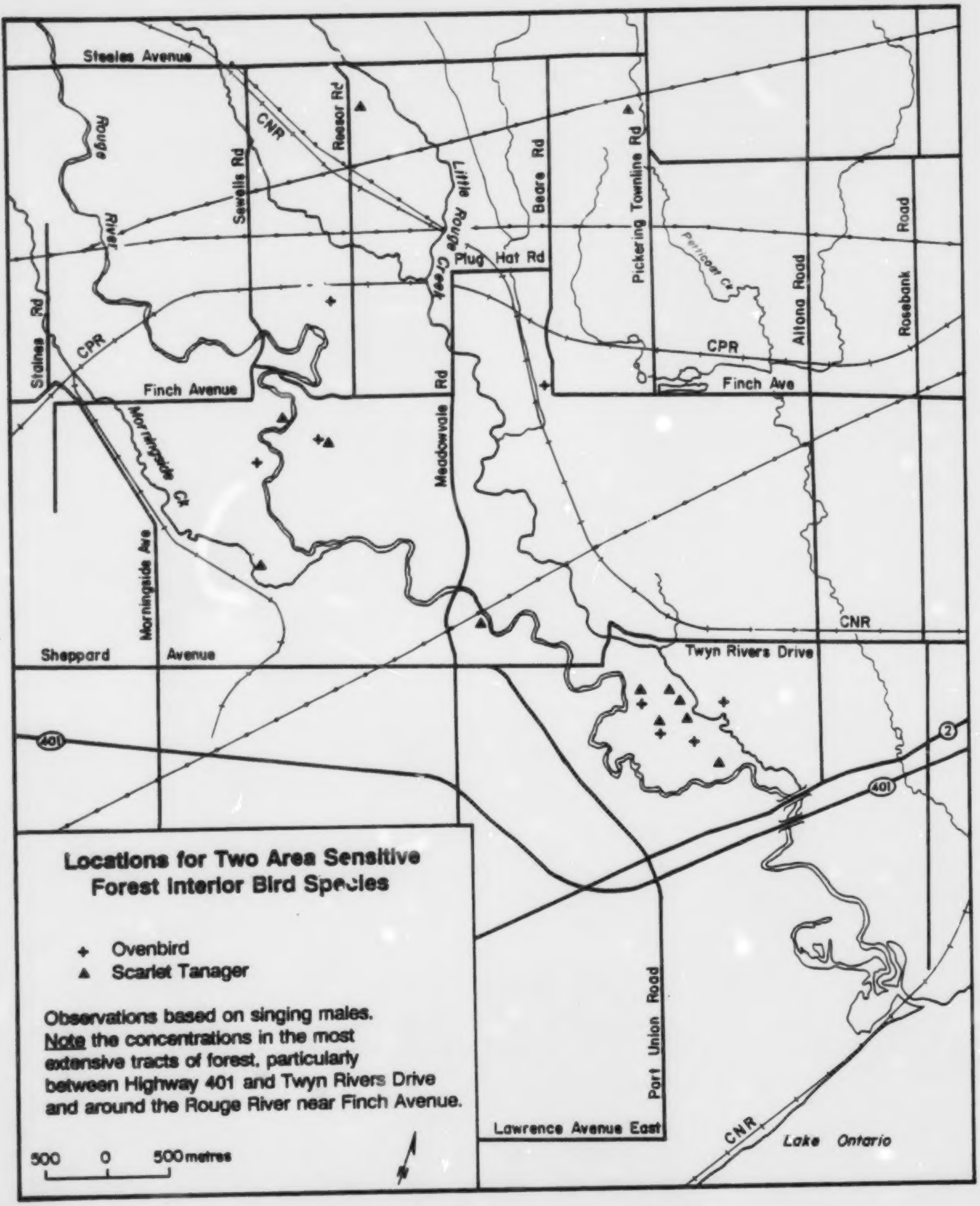
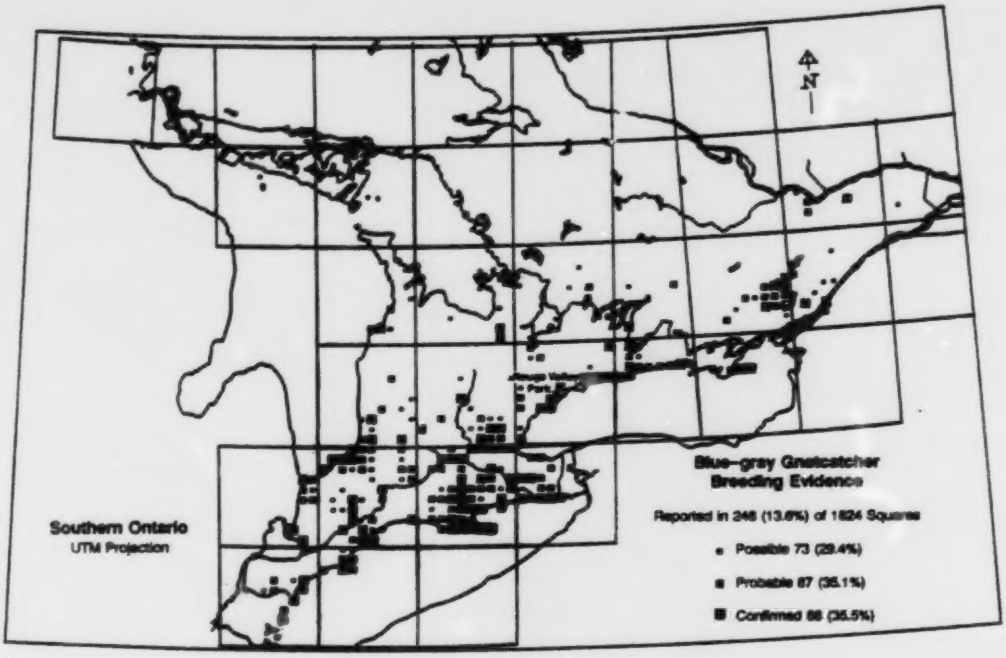
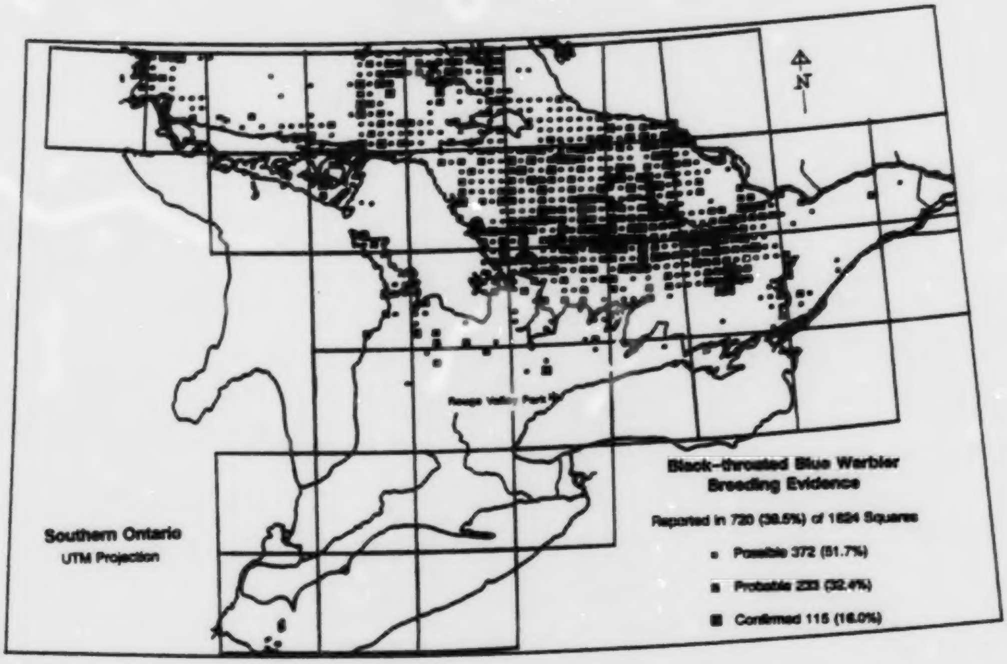

Steeles Avenue
Rouge River
CNR
Reesor Rd
Sewells Rd
Little Rouge Creek
Beare Rd
Pickering Townline Rd
Petticoat Ck
Plug Hat Rd
Road
Rosebank
Altona Road
CPR
Staines Rd
CPR
Finch Avenue
Finch Ave
Morningside Ck
Meadowvale Rd
Morningside Ave
CNR
Sheppard Avenue
Twyn Rivers Drive
401
2
401
Locations for Two Area Sensitive Forest Interior Bird Species
+ Ovenbird
▲ Scarlet Tanager
Observations based on singing males.
Note the concentrations in the most extensive tracts of forest, particularly between Highway 401 and Twyn Rivers Drive and around the Rouge River near Finch Avenue.
Port Union Road
Lawrence Avenue East
CNR
Lake Ontario
500
0
500 metres
N

Figure 25. Locations of two area-sensitive forest interior bird species in the Rouge Valley Park.


N
Rouge Valley Park
Blue-gray Gnatcatcher
Breeding Evidence
Reported in 248 (13.6%) of 1824 Squares
● Possible 73 (29.4%)
■ Probable 87 (35.1%)
■ Confirmed 88 (35.5%)
Southern Ontario
UTM Projection

a. Breeding range of the Blue-gray Gnatcatcher (Cadman, pers. comm., 1991).


N
Rouge Valley Park
Black-throated Blue Warbler
Breeding Evidence
Reported in 720 (39.5%) of 1824 Squares
● Possible 372 (51.7%)
■ Probable 233 (32.4%)
■ Confirmed 115 (16.0%)
Southern Ontario
UTM Projection

b. Breeding range of the Black-throated Blue Warbler (Cadman, pers. comm., 1991).

Figure 26. Southern Ontario distributions of two bird species at the limit of their breeding range at the Rouge Valley Park.

Table 8. Relative abundance and status of breeding birds in the Rouge Valley Park

Relative abundance is based on the average number of adult birds seen or heard per 10 kilometres of censusing in Theme Areas 1 through 9 during the 1990 breeding season. Theme Areas 10 and 11 were not surveyed.

Birds flying overhead and showing no evidence of using the area for breeding or foraging were not included. Differences in conspicuousness during breeding season, irregular survey routes and times, the variable access to areas, and other error factors have not been taken into account. The highest level of breeding status during the 1990 survey is indicated.

The first letter (UPPER CASE) indicates relative abundance:
- A - Abundant (more than 15 birds/10 km)
- C - Common (6 to 14 birds/10 km)
- F - Fairly Common (3 to 5 birds/10 km)
- U - Uncommon (1 to 2 birds/10 km)
- R - Rare (less than 1 bird/10 km)

The second letter (lower case) indicates breeding status:
- c - Confirmed (63 species)
- p - Probable (29 species)
- o - Possible (19 species)
- x - Observed during breeding season (6 species)

	Theme Area (Chapter III.iii, Fig. 39)									
Species	1	2	3	4	5	6	7	8	9	Park
Common Loon	x									x
Great Blue Heron	U-o	R-o				R-o			x	o
Green-backed Heron	U-p				x	x			x	p
Black-cr. Night-Heron	C-p	R-o								o
Least Bittern	U-p									p
Mute Swan	U-c									c
Canada Goose	A-c	R-c	x	F-o	U-o			A-o	x	c
Mallard	A-c	U-p	F-p	C-o	C-o	F-c		A-o	R-o	c
American Black Duck	R-o			F-o	U-p	R-o				p
Mallard X Black hybrid				R-o	R-o					o
Blue-winged Teal	R-c	R-o				U-o				c
Oldsquaw	x									x
Wood Duck	F-c				F-p					c
Cooper's Hawk			U-c		U-c		R-p			c
Red-tailed Hawk	R-o	U-c	U-o	U-c	U-c	U-o		F-c	F-c	c
Northern Harrier			R-o						R-o	o
Osprey			R-o		U-o					o
American Kestrel			U-p	R-o					U-p	p
Ruffed Grouse		R-c	U-c	R-p			R-o		F-o	c
Ring-necked Pheasant					U-p	F-p			F-c	c
Virginia Rail	F-p									p
Common Moorhen	U-c									c
Killdeer	C-c	x	x	U-o	R-o	C-c		C-c	C-c	c
American Woodcock				U-p	R-p				R-p	p
Spotted Sandpiper	R-o	F-p	F-c	F-p	F-c	C-p	R-o	F-o	F-p	c
Herring Gull	x									x

Table 8. (continued)

Species	Area 1	2	3	4	5	6	7	8	9	Park
Ring-billed Gull	A-o	x	x	x	x	x	x	A-o	x	o
Common Tern	x									x
Caspian Tern	x									x
Black Tern	F-c				x					c
Rock Dove				U-c	x	x		x	F-o	c
Mourning Dove	C-o	C-p	F-p	C-p	C-c	C-p	C-p	F-o	A-c	c
Black-billed Cuckoo		R-p	U-p	U-p	R-o	U-p			R-p	p
Eastern Screech-Owl	U-p	R-p							R-p	p
Great-horned Owl			U-o	F-p	F-c		R-o	U-o	U-c	c
Whip-poor-will		R-o								o
Common Nighthawk	R-p								R-o	p
Chimney Swift	F-o			R-o						o
Ruby-throated Hummingbird		R-p	R-c	R-o						c
Belted Kingfisher	U-p	F-c	F-p	F-p	U-c	R-p	F-c		U-o	c
Northern Flicker	C-c	C-p	C-p	C-p	C-p	C-p	U-p	C-p	F-p	c
Pileated Woodpecker	R-p	R-p		U-p	R-o	R-c	R-o	R-o	U-p	c
Red-headed Woodpecker									R-o	o
Hairy Woodpecker	U-o	F-c		U-p	U-p		R-o	R-o	U-p	c
Downy Woodpecker	F-p	F-c	F-p	F-p	C-c	F-p	C-p	F-p	F-p	c
Eastern Kingbird	R-o	C-p	C-p	C-p	C-p	F-p	C-p	C-p	C-c	c
Great-crested Flycatcher	C-c	C-p	C-c	C-p	C-p	C-p	C-p	C-p	C-c	c
Eastern Phoebe		R-c	U-o	U-p	R-o	R-o	R-o			c
Willow Flycatcher				U-p		F-p			C-p	p
Alder Flycatcher			U-c							c
Least Flycatcher		U-p		U-p	R-o					p
Eastern Wood-pewee	C-p	C-p	F-p	C-p	C-p	C-c	C-p	C-p	C-p	c
Horned Lark									F-p	p
Tree Swallow	U-o								R-c	c
Cliff Swallow	A-c					R-o				c
Purple Martin	R-o									o
Bank Swallow	A-o	A-c	F-c	A-c	A-c	A-o	U-o	C-o	A-o	c
N. Rough-winged Swallow	C-p	F-c	F-c	C-c	U-p	R-o	F-c	U-o	U-o	c
Barn Swallow	C-o		F-p	U-c	R-p	F-o		U-o	C-c	c
Blue Jay	A-o	C-p	A-c	A-c	C-c	F-o	C-p	C-p	A-c	c
American Crow	F-o	C-p	C-p	C-o	C-o	C-c	C-o	C-p	A-c	c
Black-capped Chickadee	C-c	A-p	A-p	A-c	A-c	A-p	C-c	A-p	A-c	c
White-breasted Nuthatch	U-o	U-p		U-o	U-c	F-c	F-c	U-o	U-p	c
Red-breasted Nuthatch	U-o	U-o	R-o			R-o	R-c		U-p	c
Brown Creeper	U-p									p
Carolina Wren	R-o									o
House Wren	F-p	F-p	F-p	C-p	C-c	A-p	C-p	C-p	F-p	c
Winter Wren	R-o	U-c								c
Gray Catbird	A-p	C-p	C-c	C-p	C-p	C-p	C-p	C-p	C-c	c
Northern Mockingbird						R-o				o
Brown Thrasher		R-p	R-o	U-p	R-c		F-p		F-p	p
American Robin	A-c	A-c	A-c	A-p	A-p	A-c	A-p	A-p	A-c	c
Wood Thrush	F-p	C-p		F-p	F-p	F-p	R-o	.	U-p	p
Veery	F-o	C-c	U-o	U-p	F-p	U-p	R-o		U-p	c
Blue-gray Gnatcatcher	F-c	R-c		U-p			R-o			c
Cedar Waxwing	F-o	C-p	C-o	C-o	C-p	C-o	C-o	C-o	A-p	p

Table 8. (continued)

	Area									
Species	1	2	3	4	5	6	7	8	9	Park
European Starling	A-c	U-c	C-c	A-p	A-c	A-c	C-p	A-c	A-c	c
Yellow-throated Vireo		R-o								o
Red-eyed Vireo	C-p	A-p	C-p	C-p	C-p	A-p	C-p	F-p	U-p	p
Warbling Vireo	U-p	F-c	U-p	C-p	U-p	C-p	U-p	C-p	F-p	c
Black-and-white Warbler						R-p				p
Yellow Warbler	C-p	A-c	C-p	C-p	C-p	C-p	F-p	C-p	A-p	c
Black-thr. Blue Warbler									R-o	o
Black-thr. Green Warbler					R-o					o
Blackburnian Warbler					R-o					o
Chestnut-sided Warbler					R-p				R-p	p
Ovenbird		F-p	R-o		U-p					p
Northern Waterthrush	R-o									o
Mourning Warbler		C-p		R-o	R-o		F-p		U-p	p
Common Yellowthroat	F-p	F-p	U-o	U-p	U-p	R-o	F-p	U-p	F-p	p
Canada Warbler		R-o			U-o	R-o	R-o			o
American Redstart	R-o	U-p			U-o	Fc-p				p
Scarlet Tanager		F-c		U-p	F-p		F-p			
Northern Cardinal	C-p	C-c	C-c	C-p	C-p	C-p	C-p	C-p	C-p	c
Rose-breasted Grosbeak	U-p	C-c	U-p	C-p	C-c	F-p	C-c	F-p	F-c	c
Indigo Bunting		C-p	U-p	U-p	R-o	R-o	C-c		F-p	c
Rufous-sided Towhee	R-o	R-p	U-p	R-o		F-p			U-p	p
Savannah Sparrow			C-p		R-o				A-c	c
Grasshopper Sparrow *										c
Vesper Sparrow									C-p	p
Chipping Sparrow		R-o	U-o		R-p	F-c		C-p	F-c	c
Field Sparrow		R-o	F-c		R-p	R-p	U-p		F-p	c
Song Sparrow	A-p	A-p	A-c	A-p	A-p	A-p	A-p	A-p	A-p	c
Swamp Sparrow	C-p									p
White-throated Sparrow		U-p								p
Bobolink		R-o	C-c		R-o			R-o	C-c	c
Eastern Meadowlark		U-p	F-c		F-p	F-p	C-p		C-c	c
Red-winged Blackbird	A-c	C-c	C-c	A-c	A-p	A-p	A-p	A-c	A-p	c
Common Grackle	A-c	C-c	F-o	C-c	C-c	A-c	C-p	A-c	A-p	c
Brown-headed Cowbird	C-o	C-p	A-c	F-p	C-c	A-p	C-p	A-c	A-c	c
Orchard Oriole					R-p					p
Northern Oriole	C-c	A-c	C-c	A-p	A-c	C-p	C-p	C-p	C-c	c
House Finch	C-o	x		F-c				U-o		c
Pine Siskin			R-o		U-o			x		o
American Goldfinch	A-p	A-p	A-p	C-p	C-p	A-p	C-p	A-p	A-p	p
House Sparrow	A-c	R-o	U-o		U-p	C-c	R-o	A-c	U-o	c
Confirmed	19	22	20	10	17	11	7	7	21	63
Probable	24	33	20	37	32	30	28	31	34	29
Possible	26	11	15	13	20	16	14	15	11	19
Observed	6	4	3	1	5	3	1	2	4	6

* 4 to 5 breeding pairs of Grasshopper Sparrow were found in Theme Area 12 (field just west of the Beare Landfill) in 1990.

Table 8. (continued)

Species observed during study period but presumed to be migrants or non-breeding immatures

Solitary Sandpiper
Greater Yellowlegs
Lesser Yellowlegs
Great Black-backed Gull (imm.)
Olive-sided Flycatcher
Hermit Thrush
Swainson's Thrush
Ruby-crowned Kinglet
Solitary Vireo
Tennessee Warbler
Nashville Warbler
Northern Parula
Cape May Warbler
Yellow-rumped Warbler
Bay-breasted Warbler
Blackpoll Warbler
Palm Warbler
Wilson's Warbler
White-crowned Sparrow

Species known to have bred within the study area but not found in 1990

American Bittern
Sharp-shinned Hawk
Red-shouldered Hawk
American Coot
Yellow-billed Cuckoo
Yellow-bellied Sapsucker
Marsh Wren
Loggerhead Shrike

Forest Species

The Rouge Valley Park's extensive forests are important breeding areas for many bird species, including the more common neotropical migrants such as Northern Oriole, Eastern Wood-pewee, Gray Catbird, Wood Thrush, Veery, Red-eyed Vireo, Warbling Vireo, Rose-breasted Grosbeak and Indigo Bunting.

Bottomland Forests:

The Rouge valley's extensive bottomland deciduous forests (CT 12) provide important habitat for several significant breeding birds. Blue-gray Gnatcatcher, at the northern limit of its range (Fig. 26a), is a Carolinian species. Green-backed Heron (and occasionally Black-crowned Night-Heron) nest in the Crack Willow - Manitoba Maple forest at the northern edge of the Rouge marshes. Least Flycatchers breed in the Manitoba Maple bottomlands (CT 12b) upriver, while Chestnut-sided Warbler, Ruby-throated Hummingbird and Least and Willow Flycatchers are associated with the Balsam Poplar - Manitoba Maple - Crack Willow lower terraces (CT 12c) north of Highway 401. Pileated Woodpecker (locally uncommon) and breeding Scarlet Tanager (Fig. 25) also make use of these bottomland forests. Mourning Warbler is a remarkably common breeding species in thickets on the deciduous forest edge, particularly in the section between Highway 401 and Twyn Rivers Drive. The locally rare Yellow-throated Vireo has bred in the mature Black Maple - Sugar Maple mid-terrace forest (CT 12e) near the Woodland Park campground. Where the bottomland forest is mixed or dominantly conifer (CT 13, 14), Pileated Woodpecker, Red-breasted Nuthatch and Canada Warbler occur, especially in the White Cedar - Manitoba Maple - Crack Willow terrace forests (CT 13a). Ruffed Grouse breed in the White Cedar bottomland forests (CT 14).

Valley Slope Forests:

The Rouge's valley slope forests are productive breeding habitats for avifauna as well. In addition to the more common species, the rare Carolina Wren (species of concern) was observed in the dry mesic deciduous forest of Red Oak - Sugar Maple (CT 16) at the edge of the Rouge marsh. The dry slope forests of Red Oak - White Oak (CT 15a,b) support breeding Eastern Screech-owl (locally uncommon) and Ovenbird (Fig. 25). Great Horned Owl are found in the dry mesic slope forest of White Pine - Hemlock (CT 18b), and in the mesic Hemlock - Sugar Maple forests (CT 19a), where Pileated Woodpecker and Canada Warbler also occur. Winter Wren (locally uncommon) and Scarlet Tanager are both associated with the larger stands of mixed slope forests dominated by Eastern Hemlock (CT 19). Red-breasted Nuthatch are often found in a variety of mixed slope stands where White Pines are present. White-throated Sparrows (northern affinity), American Redstarts and Whip-poor-wills were restricted to the White Cedar-dominated forests (CT 19d,20) north of Highway 401.

Tableland and High Valley Terrace Forests:

The tablelands and the high valley terrace forests support a variety of neotropical migrants, including several area-sensitive forest interior species, and a number of locally significant breeders. The nationally and provincially rare Cooper's Hawk was regularly observed during this study, hunting over a variety of more open habitats, but returning to tableland woodlots and conifer plantations with prey. Red-tailed Hawk and Great Horned Owl breed in mesic Sugar Maple-dominated tableland forest (CT 23b), as do Chestnut-sided Warbler (probably), and such area-sensitive forest interior species as Pileated and Hairy Woodpeckers, Wood Thrush, Scarlet Tanager and Ovenbird.

During this study, the Red-headed Woodpecker was observed only once, in a tableland woodlot of Beech - Sugar Maple - White Ash (CT 23c), where Red-tailed Hawk nested in a White Pine. Another Red-tailed Hawk nest was found in a stand of Hemlock - Sugar Maple (CT 19a), again in a mature White Pine. The stands of dry mesic mixed tableland forests (CT 24) north and south of Highway 401 are also host to locally uncommon

Eastern Screech-Owl, Ruby-throated Hummingbird and Ovenbird. Pine Warblers occurred in mature White Pines on dry oak tablelands (CT 21) north of Highway 401.

Bluff-nesting Species

The unconsolidated bluffs of the river meanders (CT 29) provide nesting sites for colonies of Bank Swallow and Northern Rough-winged Swallow. The Bank Swallow colony of several hundred pairs at the Finch Meander is especially noteworthy. Belted Kingfisher also excavate their nests in the river bluffs.

Field Species

The regenerating fields, thickets and hedgerows (CT 30,31,34) of the park, especially between Finch and Steeles Avenues, provide breeding habitat for a number of locally significant open country species. Many of these species have significantly declined or have altogether disappeared from Metropolitan Toronto as urban development eliminated farm and pasture lands. Common species include Barn Swallow, Bobolink (a neotropical migrant), Field Sparrow and Eastern Meadowlark. Less common and more local are Northern Harrier (locally uncommon and declining), American Kestrel, Tree Swallow, American Woodcock (locally uncommon) and Grasshopper Sparrow (locally uncommon and declining). Scattered shrubs of Staghorn Sumac and hawthorn in regenerating fields provide breeding habitat for Black-billed Cuckoo, Ruby-throated Hummingbird, Willow Flycatcher, Brown Thrasher and Rufous-sided Towhee, all of which are uncommon breeders in Metro Toronto. The Rouge's Vesper Sparrows are found exclusively in deciduous hedgerows bordering cultivated and fallow fields, habitat which has all but disappeared within Metro.

Species of Successional Forests

The deciduous and mixed successional forests (CT 32,33) of the Rouge Valley also provide breeding habitat for species which are uncommon to absent elsewhere in Metropolitan Toronto. These include Ruffed Grouse (in White Birch - Large-toothed Aspen - White Pine - White Cedar and White Ash - Green Ash; CT 33a,32f), Black-billed Cuckoo (in Trembling Aspen, White Ash, and White Birch - White Cedar; CT 32c,32e,33a), Pileated Woodpecker and Brown Thrasher (in White Elm; 32a), American Redstart (in White Birch - White Cedar; CT 33a), and Rufous-sided Towhee (in Trembling Aspen and White Ash; CT 32c,32e).

Anthropogenic Environments

Opportunistic but unusual bird species also utilize several human-made environments, including the park's cultivated fields (Horned Lark), fallow fields (Northern Harrier), tree nursery (Northern Mockingbird, a species at the northern limit of its range), bridges (Cliff Swallow, Barn Swallow and Eastern Phoebe), buildings (Barn Swallow), and the zoo monorail (Eastern Phoebe). Cooper's Hawk and Red-breasted Nuthatch nest in the park's conifer plantations (CT 37). These plantations may also provide breeding habitat for Pine Siskin (northern affinity), recorded during the present study, but for which no breeding evidence was observed.

Avifaunal Trends

Some of the Rouge's avifauna have declined dramatically in numbers over the past two decades. For example, the lakefront marsh historically provided breeding habitat for nationally or provincially significant species such as Black-crowned Night-Heron, Least Bittern, American Coot and Black Tern, and locally significant species such as American Bittern, Virginia Rail, Common Moorhen and Marsh Wren.

A comparison between the present study and a 1973 survey (Wainio *et al.* 1973a) reveals drastic reductions in numbers of Black Tern and Common Moorhen (Fig. 27), and the complete disappearance of American Bittern, American Coot and Marsh Wren as breeding species. Marsh species' populations do tend to fluctuate with water levels, but such broad-scale reductions are cause for concern. These declines may reflect increased human pressures on the area, such as through the development of a parking lot in the marsh (Fig. 27) and increased vehicle and pedestrian traffic. The declines may also be associated with the massive population increases of aggressive species such as Canada Goose, Mallard and Mute Swan, which may compete for nest-sites, and Ring-billed Gull and Raccoon, which are nest predators.

The nationally and provincially rare Red-shouldered Hawk (Risley 1982) previously nested in the maple - beech - hemlock forests of the Rouge Valley, and continues to breed nearby in Pickering (Speirs, pers. comm.). However, it has not been seen at the Rouge during breeding season since 1985. Factors in this species' disappearance may include the disappearance of forest corridors due to urban encroachment, reductions in amphibian and reptilian prey, and increased human use of the Rouge Valley. Reduction in woodlot size may also invite nesting competition from the highly successful Red-tailed Hawk and the Great Horned Owl (Risley 1982), both open-country species which nest in smaller woodlots and at the forest edge.

Similarly, urban encroachment may be a factor in the disappearance of the formerly regular Red-headed Woodpecker, a 'blue-listed' species of special concern in the United States, widely reported as decreasing throughout its range (Ehrlich *et al.* 1988). This species requires open woods or hedgerows with standing dead trees for nesting, and does not take to artificial nest boxes. A breeding location formerly occurred northeast of the corner of Morningside and Finch Avenues (Fairchild, Harpley, pers. comm.), now a residential subdivision. The Red-headed Woodpecker was also formerly quite common north of the Beare Road landfill site (Fairchild, Harpley, pers. comm.).

In contrast, the return of breeding Cooper's Hawk to the regenerating fields and woodlots of the park's northern interior reflect the success of ongoing passive management of the area.

Significant Birds

Four of the Rouge Valley Park's nine nationally rare or provincial species of concern are marsh nesters (Least Bittern, Black Tern, Black-crowned Night-Heron, American Coot), and are believed to have undergone widespread declines due at least in part to loss or deterioration of wetland habitats (Goodwin 1987; Woodliffe 1987; McCracken 1987; Dunn 1987). Two others are raptor species, for which habitat loss, pesticides and hunting are cited as factors in their decline, though Cooper's Hawk appears to have been making a resurgence during recent years. Red-shouldered Hawks have not bred at the Rouge since 1985 at the latest. Loggerhead Shrike, a species of marginal farmland, was designated nationally endangered in 1991 by COSEWIC, and has not been recorded as breeding at the Rouge since the 1960s. Carolina Wren and Orchard Oriole are Carolinian species which have probably never been common in southern Ontario, and both have adapted to quasi-natural environments such as gardens, old orchards and urban parkland.

A brief synopsis is given for 40 significant bird species with emphasis on breeding status, level of rarity and habitat preference.

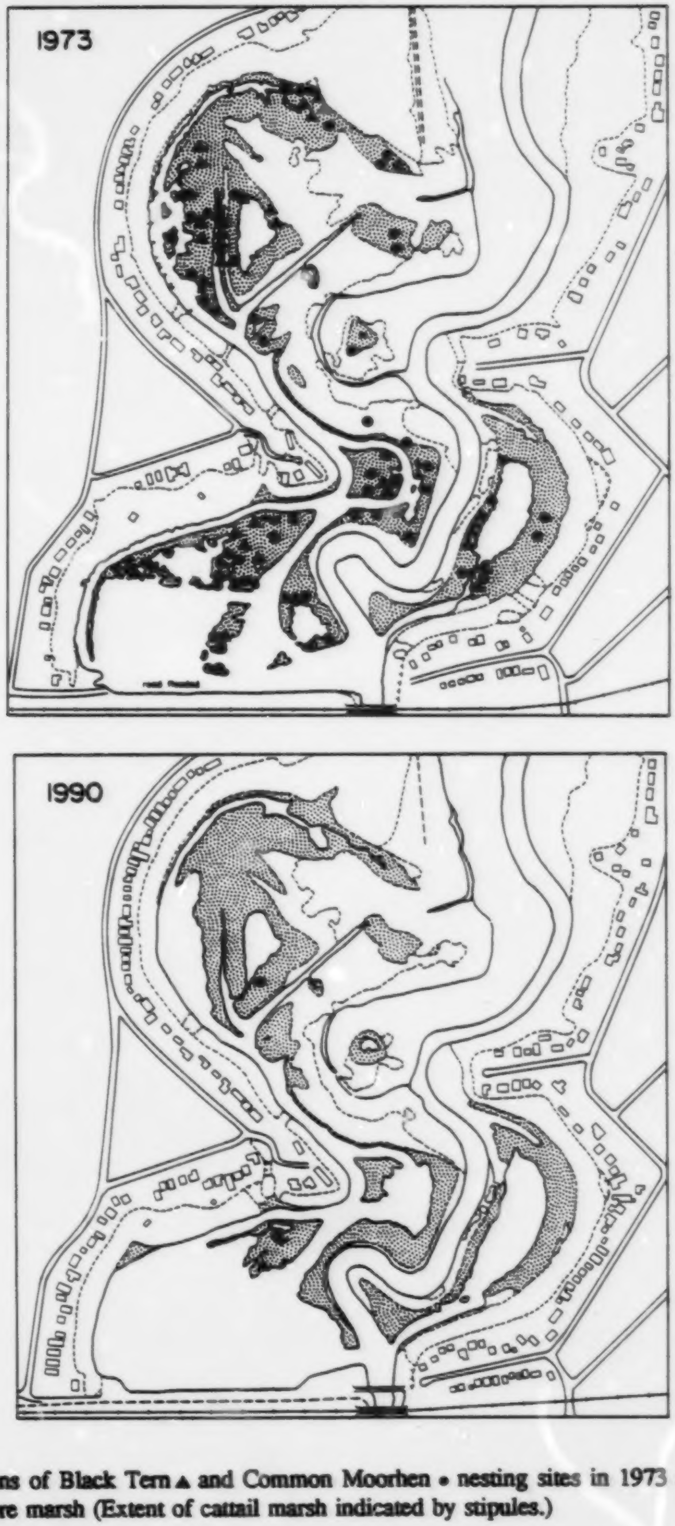


Figure 27. Locations of Black Tern ▲ and Common Moorhen • nesting sites in 1973 and 1990 for the Rouge lakeshore marsh (Extent of cattail marsh indicated by stipules.)

The following species are considered as nationally or provincially rare by COSEWIC, or as species of concern by the Ontario Rare Breeding Bird Program (Cadman 1990). Each has bred within the Rouge Valley Park.

Black-crowned Night-Heron *Nycticorax nycticorax*
The Black-crowned Night-Heron ranges broadly in both the New and Old Worlds, but its breeding presence in Ontario is limited to islands, marshes, swamps and rivers along Lakes Huron, Erie and Ontario (Goodwin 1987). Its numbers have fluctuated throughout the past century, with pesticides cited as a cause of its decline in the 1960s (Riley and Gould 1989). It appears to be making a resurgence, and where it is found the Black-crowned Night-heron can be a common and conspicuous bird, usually nesting in colonies of a few to several hundred pairs, often among other herons. This heron prefers to nest in deciduous trees and shrubs at the water's edge, although use of conifers and even matted cattails has been observed (Peck and James 1983). The lower Rouge River marsh has one report of confirmed nesting, in 1988 (Connell and Norman 1988). The species uses the marsh and the lower sections of the Rouge River for roosting and feeding throughout the warmer months. At least 11 adults and 3 immatures were present during the breeding season of 1990, and were likely non-breeding summer residents, probably visitors from the colony at Tommy Thomson Park.

Least Bittern *Ixobrychus exilis*
This small and elusive heron breeds throughout the Western Hemisphere, but in Ontario its range is spotty and restricted to the south, where it is believed to be declining (Woodliffe 1987). It is a bird of the moderately dense cattails and dense reed beds of larger marshes, although can frequent smaller marshes, even in relatively close proximity to large urban centres (Woodliffe 1987). It nested in the lower Rouge River marsh in 1973 (Wainio *et al.* 1973a), and at least one territorial male was present throughout the 1990 breeding season. Because of the marsh's size, it is unlikely that the Least Bittern has ever been common there, but it appears that a small breeding population manages to persist.

Cooper's Hawk *Accipiter cooperii*
This swift raptor is a denizen of extensive mixed and deciduous woodlands in southern Ontario and across most of southern Canada. It prefers deep, dark pine stands (Geleynse, pers. comm.) or deciduous woods in which to build its stick nest (Weir 1987). Habitat loss, pesticides and hunting have all been cited (Weir 1987) as possible causes of its decline to rare status nationally and provincially (Penak 1981). It appears to be recovering somewhat (Geleynse, pers. comm.), and has returned as a breeding species to the Rouge, with an active nest found in 1989 in a Red Pine plantation (Kirkham, pers. comm.). In 1990 this site was not in use, but breeding was confirmed in another section of the park. With conscientious protection of the Rouge's less accessible woodlots, the Cooper's Hawk should remain an impressive breeding resident, migrant and occasional winterer at the Rouge.

Red-shouldered Hawk *Buteo lineatus*
A century ago, the Red-shouldered Hawk was by far the most common hawk in southern Ontario, but abrupt population declines followed the clearing of extensive tracts of forest for farming (Weir 1987). The species was 'blue-listed' in 1972, and is now a rare breeder in the mixed and deciduous forests of southern Ontario. It usually nests near water, preferring mature maple-beech-hemlock stands (Weir 1987) with a high canopy, requirements which are met in several locations at the Rouge. A remaining stronghold exists along the Oak Ridges Moraine and in the Uxbridge area (Szuba and Norman 1988), and there are records of Red-shouldered Hawks nesting in the Rouge River valley through to the 1970s (Szuba and Norman 1988), with the latest unconfirmed report in 1985. The species continues to be found during breeding season in Pickering (Speirs, pers. comm.) in woods which are nearly contiguous with the forests of the Rouge valley. Protection of the Rouge's mature riparian forests, and management for preservation of the Rouge's reptiles and amphibians - an important element of the Red-shouldered Hawk's diet - might result in the Red-shouldered Hawk's return as a breeding species.

American Coot *Fulica americana*
This semi-colonial species ranges widely in the Western Hemisphere, but its range in Ontario is spotty and confined to the southern half of the province. It breeds in habitats with dense cattails and standing water. It is

sensitive to environmental changes, particularly in water levels, and populations are known to fluctuate accordingly (McCracken 1987). It formerly nested in small numbers (2 pairs) in the northwestern sections of the lower Rouge River marsh (Wainio *et al.* 1973a), but none were observed during the 1990 breeding season. There are autumn records to at least 1986 (Speirs, pers. comm.). This species' disappearance as a breeding species, like that of the Black Tern and American Bittern, may be an indication of the deterioration of the lower Rouge River marsh as a suitable breeding area for sensitive wetland species.

Black Tern *Chlidonias niger*

Formerly a locally common and conspicuous resident of many of Ontario's rich cattail marshes, the province's Black Tern population has undergone an alarming decline (Cadman, pers. comm.). It is a colonial nester whose requirements are quite specific. Nests are usually built on floating mats of vegetation in small openings among dense cattails with adjacent water-depth usually in the 0.5 to 1.5 m range (Dunn 1987; Fig. 28), although sometimes no nest is built at all (Peck and James 1983) and eggs are laid on an already available platform such as a muskrat house or partly-submerged tire (present study). The Black Tern was an abundant bird in the lower Rouge River marsh in the early 1970s, with 35 nests found in 1973 (Wainio *et al.* 1973a). Today, it has all but disappeared as a breeding species, with one pair nesting in 1988 (Connell and Norman 1988), and a failed attempt in 1990. A few nonbreeding adults graced the marsh through the breeding season of 1990, and were observed regularly carrying food away to the east, presumably to a nearby colony in Durham Region (Bain and Henshaw, 1990).

Loggerhead Shrike *Lanius ludovicianus*

The Loggerhead Shrike made its appearance in Ontario in the latter half of the last century with the clearing of forests for farmland, and had become locally common by the turn of the century (Cadman 1987). Since the 1940s, however, its range has gradually been contracting and its numbers diminishing (Cadman 1987), and it was declared threatened in Canada in 1985 (Cadman 1985). It was still fairly common in the 1960s when it bred in what is now the Rouge Valley Park and in adjacent districts (O.N.R.S., 1966). The regenerating fields north of the CPR line would still provide adequate though limited habitat, with their wet areas, grasslands, hedgerows and hawthorns. But with a current provincial population of probably less than 100 breeding pairs (Cadman 1987) concentrated in marginal farmlands more than 100 kilometres to the north and east of the Rouge, it seems unlikely that the Loggerhead Shrike will soon return to the Rouge as a breeding species.

Carolina Wren *Thryothorus ludovicianus*

This species breeds in shrubbery and thickets of the Carolinian forest zone. Its range is limited to extreme southern Ontario, although it appears to be expanding northward (Richard 1987). It has adapted to nest in residential areas, and has recently (in 1989 and possibly 1990) bred near Colonel Danforth Trail in Scarborough, just west of the Rouge valley (Speirs, Fazio, Fairchild, pers. comm.). This species has also been recorded in winter at backyard feeders around the lower Rouge River marsh (P.N.F. 1987). An adult and an apparent juvenile were observed singing and foraging in the woods and gardens bordering the southwest end of the Marsh on August 2, 1990 (pers. obs.). These may have been birds dispersing from the Scarborough breeding site, or possibly from another breeding location near the Rouge. Clearly, the Rouge has habitat attractive to this rare southerner. The Carolina Wren should be watched for as a potential breeding species in future years.

Orchard Oriole *Icterus spurius*

The Orchard Oriole is a Carolinian species restricted in Ontario to a narrow band along the north shores of Lakes Erie and Ontario. It is found in areas of scattered deciduous trees, along river valleys, in fields, and often close to human settlement in orchards, gardens and campgrounds (Flood 1987). There are a number of recent records of nesting in Scarborough (O.N.R.S), and a male was present through the 1990 breeding season in an abandoned orchard within the Rouge Valley Park boundaries. On one occasion it was observed bravely defending its territory against a Red-tailed Hawk. An individual of this species has been present at the same Rouge location during previous summers (Fairchild, pers. comm.). Despite the recent construction of a residential subdivision at the edge of this orchard, it is likely that a single pair continues to breed at the Rouge.

The following colonial species are also considered nationally or provincially rare, or species of concern, but have not been recorded as breeding within the Rouge Valley Park. They are regular visitors during the breeding season.

Great Black-backed Gull *Larus marinus*
This generally seafaring species breeds on both sides of the North Atlantic, but it has spread to become a rare breeder at scattered locations on the Lakes Ontario and Huron. Formerly found only in winter in the Toronto area, the Great Black-backed Gull can be expected at any season, and has nested at Tommy Thomson Park (Blokpoel 1987). It prefers flat rocky islands for nesting, although other similar mainland sites have been used (Blokpoel 1987). Second-year birds observed at the mouth of the Rouge River during the 1990 study and adults seen at other times have all undoubtedly been nonbreeding roosting or feeding individuals.

Caspian Tern *Sterna caspia*
This colonial species breeds almost worldwide, but in Ontario its range is spotty and confined to the shores of Lakes Ontario, Huron, Hudson Bay and a few of the larger inland bodies of water. It nests on the ground in open settings, usually sandy or pebbly and fairly inaccessible shorelines (Martin 1978, Blokpoel 1987). This rare species breeds at Tommy Thomson Park, and the individual seen at the lower Rouge River marsh during the 1990 study was a likely feeding visitor from that colony. The mouth of the Rouge River, where suitable breeding habitat might exist, is far too heavily used for recreation for the Caspian Tern to nest.

The following species have been recorded within the Rouge Valley Park and are considered nationally, provincially or regionally rare, or species of concern. Each breeds or has bred in Southern Ontario, but has not been recorded at the Rouge during its breeding season.

Great Egret *Casmerodius albus*
The Ontario breeding range of this rather cosmopolitan species is restricted to a few isolated locations in the southwest, where it breeds in treed swamps, tangles and sometimes in low shoreline vegetation (Peck 1987). Elsewhere in the province it is to be expected as a rare migrant and post-breeding season visitor. It is a regular visitor to the marshes along the north shore of Lake Ontario, and there are several records for the lower Rouge River marsh (Speirs, pers. comm.). The species is reported to have bred there regularly during the 1860s (Speirs 1979), but this record is unconfirmed and somewhat doubtful, since the first confirmed nestings in the province did not occur until the early 1960s.

Cattle Egret *Bubulcus ibis*
This Old World species, which has undergone an enormous worldwide range expansion during the past century, is a very rare breeding species in Southern Ontario. There is one report of three Cattle Egrets visiting the Metro Zoo property during the past decade (Moase, Fairchild, pers. comm.). This species often nests in rookeries where other herons are already present, usually building its nest in deciduous trees near water. It is not to be expected in the future, except perhaps as a very rare nonbreeding visitor to the park's marshes and fields, especially where there are grazing animals such as at the Metro Zoo.

Yellow-crowned Night-heron *Nycticorax vialaceus*
This coastal species of the Western Hemisphere is an extremely rare possible breeder in southern Ontario, but there are no confirmed nestings (Goodwin 1987). It breeds in a variety of wetland habitats, often in association with other herons, although it will nest in isolation (Goodwin 1987). There is an autumn record (September 13, 1964) for the lower Rouge River marsh (Speirs, pers. comm.; Ontario Naturalist 3(1):34). This species is to be expected at the Rouge only as a rare vagrant.

Northern Shoveler *Anas clypeata*
This species ranges widely across the northern hemisphere, with the bulk of its Canadian population breeding in the Prairie provinces. In Southern Ontario its breeding range is spotty and confined mainly to agricultural areas

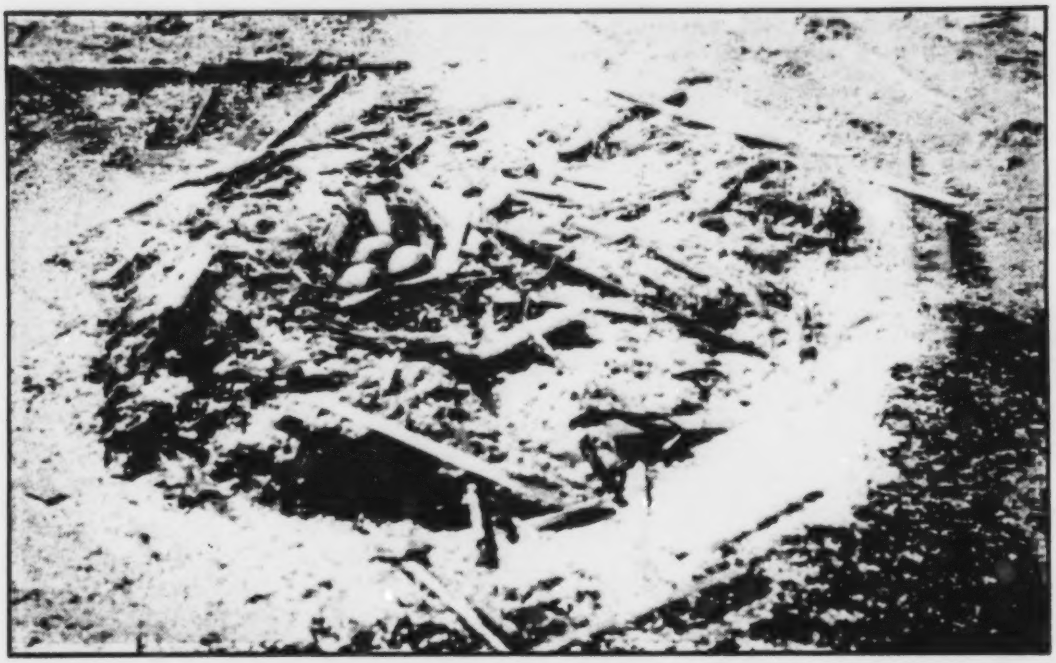


Figure 28. Black Tern had 35 nests in the lower marshes in 1973, but only one unsuccessful nesting in 1990 (JLR 1973).

Figure 29. American Bittern, with young, nesting in the cattails of the lakeshore marsh. Present in 1973, it was not breeding there in 1990 (JLR 1973).

near the shores of the Great Lakes (Sandilands 1987), and the species is considered regionally rare (Riley and Gould 1989). It is a regular but scarce migrant and an occasional winter lingerer at the lower Rouge River marsh (Speirs, pers. comm.) but no records of breeding were found.

American Wigeon *Anas americana*
This species is found throughout the continent, with greatest breeding concentrations to the north and west of southern Ontario (Sandilands 1987). It is considered a regionally rare breeder (Riley and Gould 1989). It appears to be decreasing as a migrant through the region (Bain and Henshaw 1990). At the lower Rouge River marsh, small numbers regularly occur with autumn flocks of Gadwall. No records of breeding within the Rouge Valley Park were found.

Canvasback *Aythya valisinaria*
This species breeds mainly in the North American northwest and is only a very rare breeder in southern Ontario (Sandilands 1987). There are no records of this species breeding east of Luther Marsh, and it is considered regionally rare as a breeding species (Riley and Gould 1989), and a species of concern. It is an uncommon migrant and rare winterer in the region and has occurred at the mouth of the Rouge River in early spring (P.N.F. 1984).

Redhead *Aythya americana*
The breeding range of this species is similar to that of the Canvasback, but the Redhead breeds spottily further east and more commonly in the agricultural areas of southern Ontario (Sandilands 1987). It is considered regionally rare as a breeding species (Riley and Gould 1989), and a species of concern. It is an uncommon migrant and winterer in the region (Bain and Henshaw 1990), and has occurred on Lake Ontario just east of the mouth of the Rouge River in winter (P.N.F. 1984).

Lesser Scaup *Aythya affinis*
This species breeds across North America primarily to the north and west of southern Ontario. There are only a few scattered breeding localities south of the 45th parallel (Dennis 1987), and the Lesser Scaup is considered regionally rare as a breeding species (Riley and Gould 1989). Large flocks are found offshore on Lake Ontario in migration, however, and the species may be observed from the mouth of the Rouge River in spring and fall (Speirs, pers. comm.). It is also a rare winterer in the area (Bain and Henshaw 1990).

Common Merganser *Mergus merganser*
This holarctic species is a common breeder in the Boreal Forest regions of North America. In southern Ontario, it breeds at the wooded lakes of the Canadian shield and at a few scattered locations further south (McNichol 1987). It is considered a regionally rare breeding species (Riley and Gould 1989). It is commonly seen during migration and in winter on Lake Ontario near the mouth of the Rouge River (Speirs, pers. comm.).

Red-breasted Merganser *Mergus serrator*
This holarctic species breeds across northern and central Canada, but in southern Ontario it breeds only at scattered locations mainly near the shores of the Great Lakes. It is considered regionally rare as a breeding species (Riley and Gould 1989). It is an abundant migrant and an uncommon wintering species on Lake Ontario, and is often seen during these seasons from the mouth of the Rouge River (Speirs, pers. comm.).

Bald Eagle *Haliaeetus leucocephalus*
This North American species is considered endangered in Ontario (Riley and Gould 1989). Its numbers are gradually increasing in southern Ontario since the prohibition of DDT. It nests in a variety of habitats near water, where there is an abundance of fish for consumption (Bortolotti 1987) and trees on which to build large stick nests. Within the proposed boundaries of the park, the Bald Eagle has been recorded as a rare migrant and wintering species (Harpley, Robb, pers. comm.).

Peregrine Falcon *Falco peregrinus*

The *anatum* race of this swift holarctic species is considered endangered, and is the subspecies which formerly bred in central Ontario. It nests on steep cliff-faces and has also nested in urban areas on the ledges of tall buildings (Weir 1987). Like the Bald Eagle, this species appears to be slowly recovering since the prohibition of DDT and since implementation of continent-wide reintroduction programs. At the Rouge, this species has been recorded in migration (Speirs 1977; Fairchild, pers. comm.). In the Toronto area the Peregrine Falcon is being reintroduced by the OMNR, and the Rouge Valley Park might be considered as a potential hacking area.

Wilson's Phalarope *Phalaropus tricolor*

This primarily western North American breeding species has recently arrived in Ontario as a breeder (Cadman 1987). It now nests sporadically in numerous scattered locations across southern Ontario, often at sewage lagoons with dense grassy or sedgy shores, and occasionally in marshes (Cadman 1987). It has bred within Metropolitan Toronto at Tommy Thomson Park, but apparently no longer does so (Speirs 1985). It has occurred at the mouth of the Rouge River in autumn migration (P.N.F. 1984). The wet margins of the sedge meadows of the lower marsh might be suitable habitat for breeding of this species, but such an event would be exceptional.

Long-eared Owl *Asio otus*

Although this species of concern is one of Ontario's more frequently observed wintering owls, it is notoriously difficult to locate during breeding season (Weir 1987). It is found throughout much of the Northern Hemisphere, but is known to breed only in scattered localities in southern Ontario and very sparsely in the north (Weir 1987). It nests in dense conifer or mixed stands of trees or among shrubby hawthorns, sometimes colonially. It has bred in the Metropolitan Toronto area (Goodwin 1988). The species has occurred in winter within the park (Harpley 1990; Fairchild, pers. comm.), but no breeding records were found. The species was searched for extensively during the 1990 survey.

Short-eared Owl *Asio flammius*

This species of concern is found on all continents except Australia and Antarctica, but in Ontario it breeds only very locally in widely scattered locations. It does not breed in forested areas, preferring open country such as meadows, bogs and marshes (Weir 1987). It has occurred within the park in winter (Fairchild, pers. comm.)

Red-bellied Woodpecker *Melanerpes carolinus*

This Carolinian species breeds throughout the southeastern United States, but in Ontario its range is confined to the southwest, and to scattered locations near the north shore of Lake Ontario. It prefers mature deciduous woodlands, sometimes breeding in wooded residential areas (Woodliffe 1987). There are a number of winter records for Durham Region, and a wintering individual was present at feeders at Woodgrange Avenue on the park's southeastern boundary in the mid-1980s (Speirs, pers. comm.). The species has bred in Durham Region (Bain and Henshaw 1990), and suitable habitat exists at several locations in the Rouge valley. Although breeding within Metropolitan Toronto would be an exceptional event, this species should be watched for in the future.

Many locally significant species occur or are known to have occurred within the Rouge Valley Park. The following species are near the northern or southern limits of their breeding ranges or are significant at the Rouge for other specified reasons, and have been recorded there during their breeding season.

Common Loon *Gavia immer*

The Common Loon is a common breeding species northward from the southern edge of the Canadian Shield in Ontario, but has shown declines in areas of human disturbance (Dunn 1987). There are records of breeding along the northeastern shores of Lake Ontario (Dunn 1987), but there are no recent breeding records for the heavily populated Metropolitan Toronto area. The species regularly summers near the mouth of the Rouge River, however, with a few individuals present throughout the 1990 study. This species is a fairly common migrant and occasional winterer in the area (Bain and Henshaw 1990).

American Bittern *Botaurus letiginosus*

This regionally scarce migrant and uncommon breeder formerly bred in the lower Rouge River marsh (Fig. 29; Wainio *et al.* 1973a), but none were observed during the 1990 survey. This secretive breeder of marshes, swamps, willow and alder thickets and wet fields has "undoubtedly declined due to habitat loss" (Bucknell 1987) in southern Ontario. Disturbance levels at the lower Rouge River marsh may have been a factor in its disappearance there as a breeding species.

Great Blue Heron *Ardea herodeas*

The presence of several Great Blue Herons at the park during breeding season is significant because these birds are likely visitors from a small isolated rookery in a woodlot less than a kilometre east of the proposed park boundary. This is the only known heronry between Metropolitan Toronto and Lake Scugog, and the Rouge's bodies of water are probably important feeding grounds. The Great Blue Heron has been nationally Blue-listed (Tate 1986), as it is a declining and vulnerable species. It is a common bird at the lower Rouge River marsh and the Rouge Valley Park's other bodies of water during migration, and a few sometimes linger in winter until freeze-up (T.F.N.C.N., F'80; Harpley 1990).

Osprey *Pandion haliaetus*

This provincially uncommon species is a rare and irregular breeding species in the southern portions of the OMNR's Central Region. There are reports of a breeding pair at Bruce's Mill conservation area on the Rouge watershed (Robb, pers. comm.). Otherwise, the nearest breeding occurs in the Lake Scugog area (Henshaw, pers. comm.). The presence of an Osprey along the upper sections of the Rouge River and Little Rouge Creek within Metropolitan Toronto throughout the 1990 breeding season is an indication that it might return as a breeding species in the future. Apparently, this area is regularly frequented by the species (Harpley, Fairchild, pers. comm.) at other seasons as well. The erection of nesting platforms might induce its return, as such programs have been successful in the Wellington County area and elsewhere (Taylor, pers. comm.).

Yellow-billed Cuckoo *Coccyzus americanus*

This is the less common and more southern of Ontario's two cuckoo species. It is listed as having been a probable breeder in one of the two Ontario Bird Atlas squares incorporating the Rouge Valley Park, it has nested along the park's periphery (Speirs, 1976; O.N.R.S., 1942) and there are a number of breeding season sightings within the proposed boundaries (City of Scarborough 1983; Fairchild, pers. comm.). Its habitat requirements are similar to the Black-billed Cuckoo, preferring semi-open areas with scattered trees, hawthorns or shrubs, or the edges of woodlots (Helleiner 1987). It should be expected as a rare breeding species at the Rouge.

Marsh Wren *Cisiothorus palustris*

This species breeds throughout much of North America south from central Canada, but its range is restricted by specific habitat requirements. The Marsh Wren prefers larger expanses of cattail marsh with scattered patches of open water, where it often nests in loose colonies (McCracken 1987). Two nests were found at the lower Rouge River marsh in 1973 (Wainio *et al.* 1973a), but the species was absent during the 1990 study. Because of its small size, the lower Rouge River marsh would probably never support a large population of this species. The Marsh Wren's apparent disappearance as a breeder, like that of the American Bittern, American Coot and Black Tern, is nevertheless cause for concern.

Blue-gray Gnatcatcher *Polioptila caerulea*

This Carolinian species' breeding range extends from Central America to extreme southern Canada. Its habitat preferences include a wide variety of forested and semi-open settings, but it is most commonly found in wet deciduous woodlands (Sutherland and Gartshore 1987). The species thus breeds in its typical habitat within the park, and was found almost exclusively in the deciduous bottomlands dominated by Manitoba Maple, Crack Willow and Peach-leaved Willow. This attractive southerner is an uncommon but regular breeder at the Rouge.

Northern Mockingbird *Mimus polyglottos*

This common breeding species of the southern United States has expanded its range northward during the past century (Curry 1987). It is fairly common on the Niagara Peninsula, but a rare and irregular breeder elsewhere in southern Ontario (Curry 1987). It has nested near the park in Pickering (O.N.R.S., 1957), and occurs quite regularly in the Metropolitan Toronto area at other seasons. A single Northern Mockingbird was observed in mid-July in suitable breeding habitat within the park during the 1990 study, and a non-birder indicated that this bird may have been present throughout the breeding season. The park's abandoned orchards, nursery and residential areas may attract this species to breed in the future.

Yellow-throated Vireo *Vireo flavifrons*
This uncommon breeding species in Southern Ontario ranges across eastern North America from southern Canada to the Gulf of Mexico. It is a bird of mature deciduous woodlands and is concentrated in the more heavily forested areas of the Great Lakes-St. Lawrence forest and eastern deciduous forest regions (James 1987). It bred in the towering Black Maple-Sugar Maple stand east of Little Rouge Creek south of Steeles Avenue in the 1980s, and may have been present south of Twyn Rivers Drive along Little Rouge Creek during the 1990 study. This species is to be looked for as a rare breeding species in the mature deciduous stands of the Rouge Valley Park in the future.

Black-throated Blue Warbler *Dendroica caerulescens*
This species ranges across a wide band through east-central Canada. In Ontario it breeds mainly north from the southern edge of the Canadian Shield, though it is reported to have formerly been a more common breeder further south (Fraser 1987). It prefers upland mixed and deciduous forests with dense undergrowth for nesting. The species has apparently been confirmed as breeding within the park (City of Scarborough 1983), and a singing male was present in suitable breeding habitat of wet mesic deciduous tableland forest on June 10, 1990. This would represent a substantial breeding range extension from that of Ontario Breeding Bird Atlas findings (Cadman *et al.* 1987). This elegant warbler should be looked for as a breeding species in the future.

Pine Warbler *Dendroica pinus*
This scarce migrant and summer resident in the region is found primarily during breeding season in the extensive pine plantations and native pine stands of the Oak Ridges Moraine. Elsewhere in the Toronto area it is rare or absent as a breeding species, being restricted to sites with pines, preferably white pines, at least 40 to 50 years old (Eagles 1987). A singing male was heard at the height of the 1991 breeding season in the mature pines of the interfluvial oak tableland forests south of Twyn Rivers Drive. None were found during the 1990 survey despite searches in suitable habitats, suggesting that the species is a rare occasional breeder in the park.

Canada Warbler *Wilsonia canadensis*
The Canada Warbler ranges in summer across southern and central Canada and south in the northeastern United States along the Appalachians. In extreme southern Ontario its range is spotty and confined to more extensively forested areas. It prefers wet mixed coniferous and deciduous woods for breeding (McLaren 1987). Several singing males were found in ideal breeding habitat in June and July during the 1990 study, but breeding was not confirmed. With ongoing regeneration of the park's wetter mixed forests and woodlots, there is a good likelihood that the Canada Warbler will be confirmed in the future as a breeding species.

Grasshopper Sparrow *Ammodramus savannarum*
The Grasshopper Sparrow is a locally common breeding species in southern Ontario, having undergone a considerable eastward range expansion with the clearing of the province's forests for agriculture (Rising 1987). It is an inconspicuous bird which prefers treeless well-drained grasslands with singing perches (often mullein) for breeding. Several pairs were found breeding in the grassy field just west of the Beare Road Landfill during the 1990 study. Goodwin (1988) describes it as uncommon in the Metropolitan Toronto area during breeding season, and as undergoing "serious declines". Although the Grasshopper Sparrow is not a particularly rare bird in southern Ontario, it is an interesting grassland member of the park's avifauna.

MAMMALS

The Rouge Valley Park supports twenty-seven mammal species, a good diversity for a suburban area in southern Ontario. One other species, White-footed Mouse, is a tentative occurrence; two species are recently extirpated, Porcupine and River Otter; and one other, the Black Bear wandered through the park in 1991 (Appendix C).

Eleven of the extant mammal species are considered rare or uncommon in Metro Toronto (Table 9).

These mammal records for the park are largely based on incidental observations during surveys carried out in the 1970s and 1980s (Wainio *et al.* 1973a, M.T.R.C.A. 1982, City of Scarborough 1983). P. Harpley also provided valuable observations on mammals in the park during the 1980s (Harpley 1982a,b), the late C.D.H. Clarke provided records from the 1950s to 1980s, and M. Stabb provided Northern Flying Squirrel locations. The only intensive mammal surveys have been carried out in several field habitats in the lower valley by the Royal Ontario Museum in 1980. The most detailed survey at present is the ongoing study of the Rouge River Valley south of the Metro Toronto Zoo being carried out by Peter de Groot under the auspices of the Metro Zoo and the Royal Ontario Museum (de Groot and Carvio 1990). Historical evidence in the mammal collections of the Royal Ontario Museum consists only of several common species collected from near Rosebank at the mouth of the Rouge River in the 1920s and 1930s.

REPTILES AND AMPHIBIANS

The Rouge Valley Park sustains the most diverse population of reptiles and amphibians in Metropolitan Toronto and some of Metro's most critical herptile habitats (Johnson 1983). Nineteen reptile and amphibian species are resident in the Park (Appendix D). Five extant species are considered rare in Metro Toronto, and two are considered uncommon (Table 9). These records are largely those of Bob Johnson of the Metro Zoo who is carrying out an inventory of Metro Toronto's herpetofauna (Johnson 1983). Additional information is available from three previous studies carried out in the park during the 1970s and 1980s (Wainio *et al.* 1973a, M.T.R.C.A. 1982, City of Scarborough 1983), and the incidental observations of Jim Fairchild and Paul M. Catling.

Herpetofauna populations appear to be suffering serious declines in the Metro Toronto area and to a lesser extent in the park. This appears to be attributable to loss of habitat, particularly the loss of critical wetlands used as breeding or resident sites, the loss of woodlands, the removal of dead or felled trees, the collecting and harvesting of herps for various purposes, the increase of predator populations (i.e. Raccoon), road kills, and contaminants (i.e. road salt, heavy metals, pesticide contamination, acid rain).

The wetlands in the park, particularly the marshes, ephemeral woodland ponds, and swamps, are essential breeding habitats for a number of the park's amphibians, including the Blue-spotted Salamander, Yellow-spotted Salamander, Eastern Newt, American Toad, Tetraploid Gray Treefrog, Western Chorus Frog, Wood Frog, Northern Leopard Frog, and Green Frog. Other herps are resident generally in permanent bodies of water, such as the Mudpuppy, Painted Turtle, Map Turtle, Blandings Turtle, and Common Snapping Turtle. Several snakes, including the Common Garter Snake, and particularly the Northern Water Snake, rely on wetlands as a source of prey.

Historically, the park and it environs have suffered a serious loss of wetlands critical to herp populations. For example, there were once extensive swamps and ponds maintained by water discharging from the Lake Iroquois beach deposits just west of the park south of Sheppard Avenue, and around the Beare Road landfill. Most of these wetlands were lost to aggregate extraction in the 1950s, to the Beare Road landfill in the 1970s to 1980s, and to housing around Meadowvale Road in the 1970s. A remnant swamp and pond in the Centennial Forest and Swamp ESA, an important breeding pond for Wood Frog, was partially drained and filled in during the late 1980s (Johnson, pers. comm.). Wetland loss appears to have been responsible for the local extirpation of the Yellow-spotted Salamander. It was last seen in the 1960s in the vicinity of ponds under the hydro-line northwest of Meadowvale Road and Sheppard Avenue (Johnson, pers. comm.), at which time the ponds were filled in.

Table 9. **Significant mammal, reptile and amphibian, and fish species in the Rouge Valley Park**

Mammals

Rare or Uncommon in Metropolitan Toronto
- Pygmy Shrew
- Hairy-tailed Mole
- Hoary Bat
- Keen's Bat
- Northern Flying Squirrel
- American Beaver
- Coyote
- Ermine
- Long-tailed Weasel
- Mink
- White-tailed Deer

Fish

Nationally and Provincially Vulnerable
- Central Stoneroller
- Redside Dace

Reptiles and Amphibians

Rare in Metropolitan Toronto
- Mudpuppy
- Blue-spotted Salamander
- Yellow-spotted Salamander
- Common Map Turtle
- Blandings Turtle
- Northern Water Snake

Uncommon in Metropolitan Toronto
- Red-spotted Newt
- Tetraploid Gray Treefrog

Salamander species such as the Eastern Redback Salamander, Eastern Newt, Blue-spotted Salamander, and Yellow-spotted Salamander rely on moist rotting logs and stumps in woodlands, as a source of food and to stay moist during the summer months (Cook 1984).

Turtle populations are dependent on good sandy or gravelly egg-laying sites. Nesting sites for Snapping Turtles were found on a sandy residential knoll and on a large gravel and sand riverbar (B. Johnson, pers. comm.). The large turtle population in the Rouge lakeshore marsh nests on the surrounding uplands, now largely residential. Fortunately, landowners can encourage turtles through a variety of methods (removal of fences, protection of nests).

Snakes rely on hibernaculums during the winter months. The park's hibernaculums include stone fences and house foundations. The habit of some snakes of basking on asphalt roads make them particularly vulnerable.

The potential for increasing herptile populations in the park is great (Johnson, pers. comm.). Relatively minor management techniques (i.e. leaving downed logs in woodlands, creation of minor seasonal wetlands, protection of nesting sites and hibernacula) would improve reptile and amphibian habitat.

FISH

The Rouge Valley Park supports a high diversity of fish, fifty-five species (Appendix E). Records are based on the 1984-85 survey by R. Steedman for the portion of the park north of Highway 401 (Steedman 1987), and of five surveys of the lakeshore marsh carried out in 1973, 1974-75, 1983-84, 1985-86 and 1989-91 (Wainio *et al.* 1973a; Macnab and Hester 1976; Snowden 1983, 1984; Stephenson 1988; and Buchanan and Bianchi 1992). The earlier surveys of the lakeshore marsh also sampled the river channel downstream of Highway 401 (Wainio *et al.* 1973a), and the Lake Ontario shore in the immediate vicinity of the Rouge River mouth (Macnab and Hester 1976). The quantitative data from four lakeshore marsh surveys are summarized in Table 10.

Historically, the rivers and the fish populations in the park have undergone dramatic changes. Steedman (1987) notes that before land clearing small tributary streams were much more numerous than is presently observed, the river channels probably contained abundant large log jams, and the main rivers often had multiple channels and extensive side channels and backwaters. The Rouge and Little Rouge were probably inhabited throughout by cold- or cool-water fish species such as Brook Trout and juvenile Atlantic Salmon (Steedman 1987).

Land clearing in the mid-1800s, and recent urbanization of the watershed have increased flood peaks and erosion, reduced base water flow, increased turbidity, and raised temperatures of the park's rivers (Steedman 1987). The restoration of aquatic ecosystems has become a goal of the Comprehensive Basin Management Strategy for the Rouge River Watershed, and Fisheries Management Plan (M.T.R.C.A. 1991), of the Metropolitan Toronto and Region Conservation Authority. That study adopted target fish species for various parts of the Rouge River, to represent the desired fish communities and aquatic habitats. Rainbow Trout and Brown Trout have been selected for the park's rivers, and Largemouth Bass for the lakeshore marshes. These species already occur in these habitats, but improvements in the health and population numbers of these species will occur if riparian corridors are restored, if ground water discharge areas are protected, and if stream sediment loads and temperatures are reduced.

One of the significant habitats in the park for fish is the Rouge lakeshore marsh. The high primary and zooplankton productivity provide abundant food resources, while the extensive Water-lily beds and cattails provide refugia for fish. Tasha Stephenson (1988, 1990) demonstrated that the marsh is an important habitat for fish, especially for reproduction. Fourteen fish species utilize the marsh for both spawning and rearing, and another twenty-two species use the marsh for either spawning and or rearing (Stephenson 1988) (Appendix E). In comparison with four other lakeshore marshes around Toronto, the Rouge was ranked with the Duffins Marsh as the richest fish habitat in terms of common species, total number of species, and number of reproducing fish species (Stephenson 1988). The Rouge marsh was the only one of the five to support spawning and rearing Northern Pike and Bowfin.

Northern Pike are a top predator, a cool water species and, where spawning, an indicator of the availability of well-flooded, productive marsh edge habitat during the spring. Individuals in the marsh are often in poor shape, and spawning could be improved by softening and vegetating the edge of the marsh along the road and parking area beside the lakeshore railway. If road removal enabled improvement of spawning habitat, Northern Pike might be considered another worthwhile target species for marsh fisheries management (Buchanan, pers. comm.).

Pike, Yellow Perch and Gizzard Shad spawn and feed near the mouth of the marsh. They are indicative of the important linkage between the marsh and the pelagic and littoral fish communities of Lake Ontario. The marsh provides a sheltered environment for various aspects of their life cycle, and a thermal refugium from coastal coldwater upwellings that can change waterfront temperatures by 10-12°C (Buchanan and Bianchi, in prep.).

Fish utilization of the Rouge marsh changes dramatically from month to month. For example Brown Bullhead are most abundant from April to June, while Pumpkinseed increases in numbers from August to November with those late in the season largely young of the year (Stephenson 1988). Gizzard Shad are most plentiful in June and July, with young of the year common in late August. White Sucker and Yellow Perch are common in late April, with young of the year most common in the fall. Alewife are abundant in June and July.

Fish population trends in the Rouge marsh are difficult to determine due to the different techniques and times used in the surveys in 1973, 1974-75, 1985-86, and 1989-91 (Table 10). The two earlier studies show Brown Bullhead making up over 80 percent of the fish censused, but Brown Bullhead appear to have declined in the 1985-86 survey in spite of a similar netting effort. Interspecific competition for aquatic resources also changes fish communities over time. Such competition and the introduction of new species may have as significant impacts on fish communities as do habitat changes.

Table 10. Major fish populations of the lower Rouge River and marshes, 1973, 1974-75, 1985-86, and 1989-91.

Species	1973[1]			1974-1975[2]			1985-1986[3]		1989-1991[4]	
	Total Nos.	Nos. per 100 net hrs.	%	Total Nos.	Nos. per 100 net hrs.	%	Total Nos.	%	Total Nos.	%
Brown Bullhead	2,727	581	82	3,373	688	84	216	20	121	8
Pumpkinseed	238	51	7	60	12	2	551	50	50	3
Rock Bass	88	19	3	17	4	–	35	3	7	–
Gizzard Shad	61	13	2	42	9	1	11	1	1,103	66
Yellow Perch	54	12	2	222	45	6	151	14	60	4
White Bass	35	8	1	10	2	–	1	–		
Carp	33	7	1	41	8	1	23	2	35	2
Northern Pike	25	5	1	40	8	1	19	2	18	1
Smallmouth Bass	22	5	1	5	1	–	3	–	107	6
White Sucker	19	4	1	119	24	3	38	3	94	6
Bowfin	4	1	–	3	1	–	3	–	1	–
American Eel	1	–	–	7	1	–				
Black Crappie				33	6	1	12	1	22	1
White Perch				21	4	1	8	1	10	1
Rainbow Smelt				6	1	–			2	–
Round Whitefish				4	1	–				
Largemouth Bass				4	1	–	33	3	4	–
Coho Salmon				3	1	–				
Freshwater Drum				1	–	–			1	–
Chinook Salmon									3	–
Trout-perch									2	–
Bluegill									1	–
Walleye									1	–
Rainbow Trout									6	–
Brown Trout									16	1
Totals	3,332			4,011			1,104		1,666	

[1] 1973 data based on combined catches from 0.8 m diameter hoop nets and from gill nets from June 20 to July 13 at 12 stations in the Rouge lakeshore marsh, with 5 stations in the marsh and 7 stations in the Rouge River (Wainio *et al.* 1973a).

[2] 1974-75 data based on combined catches from minnow trap, and hoop and gill nets from May 21 to September 23 at 3 stations in the Rouge lakeshore marsh, and in Lake Ontario in the immediate vicinity of the Rouge River mouth (Macnab and Hester 1976).

[3] 1985-86 data based on combined catches from kushneriuk trap, minnow trap, hoop net, fyke net, seine and electrofisher from April 7 to November 25 at numerous stations in the lower half of the Rouge lakeshore marsh (Stephenson 1988).

[4] 1989-91 data based on combined catches from electrofisher and seine from the summer at 6 stations in the Rouge lakeshore marsh (Buchanan and Bianchi, in prep.).

Two fish species, Redside Dace and Stoneroller are considered nationally and provincially vulnerable (Map 3).

Redside Dace *Clinostomus elongatus*

This small minnow is restricted in Canada to southern Ontario, predominantly to streams flowing into western Lake Ontario (Parker *et al.* 1986). It requires cool clear water and may be sensitive to turbidity. In the park it was collected on Morningside Creek in 1985 by R. Steedman. This portion of the creek now has adjacent housing and industry developments on the surrounding uplands, and greater stormwater discharge. There is also an older collection from 1974 in the Rouge River just north of Highway 401 (Ontario Ministry of Natural Resources, Fish Species Distribution System, Fisheries Branch).

Stoneroller *Campostoma anomalum*

This large minnow is confined in Canada to several streams flowing into Lake Ontario including Duffins Creek, Rouge River, Niagara River and Frenchmans Creek, and the Thames River and Lake St. Clair drainage basins (Scott and Crossman 1973, McAllister 1983). In the park it was collected on Little Rouge Creek in 1984 at Meadowvale Road (Holm and Boehm ROM 4747) and to the south near the Beare Road landfill access road (Steedman ROM 5267) in 1986, in the Rouge lakeshore marsh (Stephenson 1988), and in 1991, in lower Morningside Creek (Wigham, pers. comm.).

v) MODERN PROCESSES OF LANDSCAPE CHANGE

Historically, the changing landscapes of the Rouge have reflected the rich economic resources of the valley, the agricultural resources of the tablelands, and the energy and power of the river itself. In the past 35 years the valley has largely come under public ownership and attitudes have changed towards the conservation of water and valleylands, and the environment in general. A re-naturalization of the valley has occurred. Many degraded forests, fields and slopes have been recovered by biologically diverse and more stable vegetation communities. The former young second-growth forests have matured. These structurally diverse habitats now support a rich faunal assemblage.

The history of dynamic change in the valley is key to recognition of the potential for change in the future. Some of the more important modern processes of change in the park area are human activities, natural succession and regeneration, and river and lakeshore dynamics.

NATURAL AREAS CONVERTED TO OTHER LAND USES

Since the 1920s, 171 ha of natural areas (forests, thickets, swamps and marshes) have been converted to other land uses in the park. The causes of these losses in order of area have been: hydrolines (28.6 ha); recreational facilities (24.7 ha); agriculture (23.4 ha); Highway 401 and other roads (22.1 ha); Beare Road landfill (20.9 ha); housing (18.3 ha); aggregate extraction (16.4 ha); fill (1.7 ha); and pipelines (1.4 ha) (Map 1).

A further 41.5 ha of mature forest were degraded by heavy logging or clearcutting between the 1930s and 1970s. The most extensive cutting occurred in the 1930s when 10 sites, totalling 30.4 ha were clearcut. In 1946, 1950 and 1971, five sites, totalling 11.1 ha, were heavily logged. Two areas were selectively logged in the 1960s and 1980s (10.2 ha). In the 1960s, about 500 White Pine were removed from a mature mixed forest on the interfluvial tableland south of Twyn Rivers Drive and, in the 1980s, a Beech-Sugar Maple slope in the Beare Road woodlot was selectively logged.

RECENT REGENERATION

Since the 1940s, 126 ha of new forests and thickets have regenerated naturally in the park. They include successional forests of Trembling Aspen, Large-toothed Aspen, Balsam Poplar, White Birch, White Elm, White Ash and Green Ash; bottomland forests of Manitoba Maple and willow; White Cedar forests; and thickets of hawthorn and Red-osier Dogwood. These new forests and thickets are naturally adventive in abandoned orchards, agricultural fields, former cottage and farm sites, and pastures (Map 1). They have also been encouraged by the decrease in the once common practice of pasturing cattle and sheep in wooded areas (R.H.D.P. 1956).

The growth of new forests has been particularly dramatic in the valley bottomlands of the Rouge River and Little Rouge Creek, south of Twyn Rivers Drive. Up to the 1940s, pastures covered most of the wide bottomlands, with only a few small patches of White Cedar forest. Today there is about 40 ha of Manitoba Maple and willow forests covering all the Little Rouge Creek bottomlands and large sections of the Rouge River bottomlands.

Dramatic changes have also occurred on upland sites. Large tracts east and west of Reesor Road and south of the Beare Road landfill were once heavily grazed or cultivated. Since abandonment, they have developed hawthorn thickets, meadow marshes and successional forests. Forests have also regenerated on the 37.9 ha of land which were clearcut between the 1930s and 1950s. This includes the extensive tableland forests north of Finch Avenue between Sewells and Reesor Roads, and the former clearcuts in the Rouge River valley at the Metro Toronto Zoo.

RIVER DYNAMICS

The rivers in the park have changed their alignments frequently between 1860 and the present (Map 1). Major river meanders have been cutoff, and others have formed on previously straight river channels. Storm floods, dams, bypass ponds, storm water management and bank armaments have all played roles in the modern life of the river. The processes of deposition and erosion have been ongoing, and have largely won out over man's first 150 years of river-based activities. The effect of Hurricane Hazel on the park cannot be overstated, leading as it did to removal of floodplain homes and dams, and public ownership of the valley. The dynamic nature of river courses highlights the need to keep buildings and other structures away from the bottomlands and valley slopes.

The most dramatic changes in river courses over the past 60 years occurred during Hurricane Hazel, the storm event of October 15 and 16, 1954. Floodwaters from the storm caused 17 major realignments along 3.8 km of the Rouge River and 5 major realignments along 1 km of the Little Rouge Creek. It also destroyed or resulted in the removal of more than 125 homes and other buildings, and 3 km of roads from the valley (Map 1).

Less dramatic realignments have been observed on aerial photographs dating back to the 1930s and on maps back to 1860. For example, the Rouge River ran through the centre of the present day Glen Rouge campground until the 1920s, and a secondary river channel remained there until 1945. The oxbow lakes now in the lower Rouge marshes were originally the main channel of the Rouge River until the 1920s, and they became a secondary channel until the 1940s. The small bottomland marsh just south and east of the Highway 401 bridge sits on the former river bed of the Rouge, which coursed through here as recently as the 1920s.

Wherever the river cut into valley slopes spectacular erosional bluffs have been formed with exceptional exposures of geological stratigraphy (Eyles and Boyce 1991). All the current erosional bluffs were also present in the earliest available aerial photographs from the 1930s. Three erosional bluffs active in the 1930s, however, have since become revegetated after the river shifted its course away from the bluffs (Map 1).

The Rouge watershed as a whole, and the quantity and quality of its waters have been the subject of a recent basin study (M.T.R.C.A. 1990). It is clear that past and future river dynamics can only be seen in conjunction with human activities in the watershed. Peak flow events, overall discharge volumes, base flow volumes, water temperatures, dissolved oxygen levels, sediment loads, erosive capabilities, pollutant levels - these are only some of the characteristics of the river which depend very much on how we manage on-site and upstream stormwater, water infiltration, water retention and discharge, and point-sources of pollution.

LAKEFRONT MARSH DYNAMICS

Lakefront marshes are considered to be some of the most productive marshes in Ontario. Fluctuating water levels experienced in these marshes enhances primary productivity by accelerating decomposition and the release of nutrients from sediments during drawdown, and remobilizing phosphorus and trace metals during high water levels (Burton 1985). Interspersion of vegetation and open water is enhanced in lakeshore marshes because cyclical highs in water levels reverse successional trends towards a closed marsh (Geis 1970, Keddy and Reznicek 1986). High interspersion is especially important to waterfowl (Kaminski and Prince 1981). Areas of high interspersion of submergent, floating and emergent vegetation in lakeshore marshes in turn support some of the highest concentrations and diversity of fish species (Emery 1978, Janecek 1988). For most of these fish, lakeshore marshes are essential spawning and rearing sites (Stephenson 1988).

The Rouge River lakefront marsh is typical of the marshes along the north shore of Lake Ontario, occupying a flooded lower valley ravine behind a baymouth bar (Fig. 3). The baymouth bar was stabilized in 1856 by the railway embankment, but the river meanders and marsh vegetation have continued to evolve dynamically.

The lakefront marsh has experienced dramatic changes in the relative abundance of open water and marsh wetland types. These changes correlate strongly with fluctuations in Lake Ontario water levels (Fig. 30). Similar trends have been observed in other lakeshore marshes on the Great Lakes (McDonald 1955, Jaworski and Raphael 1979, Cecile 1983, Farney and Brootchout 1982, Stuckey 1989). In the nearby Lake Ontario marshes of Duffin Creek and Shoal Point, the marsh vegetation changes through time have been almost identical to those documented for the Rouge marshes (Fig. 31).

Lake Ontario water levels fluctuate both seasonally and over the longer term. Water levels are typically highest in June, coincident with the spring runoff, and lowest in December. The average difference in water levels between these two months is about half a meter. The lake has also gone through longer term cycles which have lasted for years or even decades and are related to regional climate changes. These periods of high and low cycles have varied by as much as 2.1 m during this century.

Even larger scale variations in water levels are postulated to occur over 200 to 900 year cycles in relation to major climatic changes and isostatic rise in the Lake Ontario outlet (Flint, Dalrymple and Flint 1988). Periods of stable or falling water levels alternate with periods of rapid rise, such as has occurred over the past 400 years, during which water levels have risen on average by 2 m.

The dynamic response of lakeshore wetland vegetation to changes in water levels is not unexpected, because species and communities are strongly aligned along a moisture gradient (i.e. depth of water). Areas of open water, up to 2 m deep, support submergent and floating aquatics, while emergent cattail marshes are restricted to standing water less than a metre deep. Lemay and Mulamoottil (1980) noted that the optimum depth for many submergent species in Toronto-area lakeshore marshes was 50 to 80 cm. Shallow waters less than 15 cm deep or only periodically flooded support sedge marshes and graminoid meadow marshes. On the drier sites, flooded almost annually but only for brief periods, thickets and bottomland forests occur.

The distribution of these communities is in a state of flux. During low lake levels, the wetland communities shift lakeward. Exposed mudflats are initially colonized by such regionally significant annuals as Water Purslane (*Ludwigia palustris*), Engelmann's Nut-grass (*Cyperus engelmannii*), False Pimpernel (*Lindernia dubia*), and a spike-rush (*Eleocharis intermedia*). Annuals are particularly adapted to low lake levels, even seasonally low levels during the fall. The exposed soils also allow for seed germination and lakeward expansion of perennials such as cattails, sedges and Canada Blue-joint Grass. In contrast, open water and its associated aquatic communities shrink in area and in numbers.

During high lake levels, the wetland communities will shift landward. Annuals will be present only as long lived seeds in the flooded mudflats. Cattail marsh dies back along its water interface, replaced by open water aquatic communities. The cattails invade the wetter graminoid marshes. Moreover, woody plants which have colonized the marsh during lower lake levels are killed off, increasing the area of marsh occupied by herbaceous wetland species.

Lake Ontario's fluctuating water levels have maintained the Rouge lakeshore marshes in a herbaceous wetland stage (Keddy and Reznicek 1986). Stabilization of water levels, whether at low levels or at high levels, will reduce the area of marsh as woody plants encroach to its edge. Stable lake levels also cause a decline in vegetation diversity and plant species diversity. Dominant species such as cattails, kept in check by fluctuating water levels, would form extensive monocultures. Figs. 30, 31 illustrate the high sensitivity of cattail marsh to lake level changes. The extent of cattail marsh responds more quickly and dramatically to water level fluctuations than the graminoid marsh. High water levels physically drown cattail stands and, combined with wave action, tear away pieces of cattail mat and carry them out to the lake. During low lake levels the peat mats which once supported cattail marsh are again exposed, providing a ready substrate for colonization by cattail and other seeds resident in the peat.

Since the installation of the St. Lawrence Seaway, Lake Ontario has been regulated to some extent. Regulation from 1961 to the present has resulted in a raising of water levels by up to 0.5 metres during low periods (i.e.

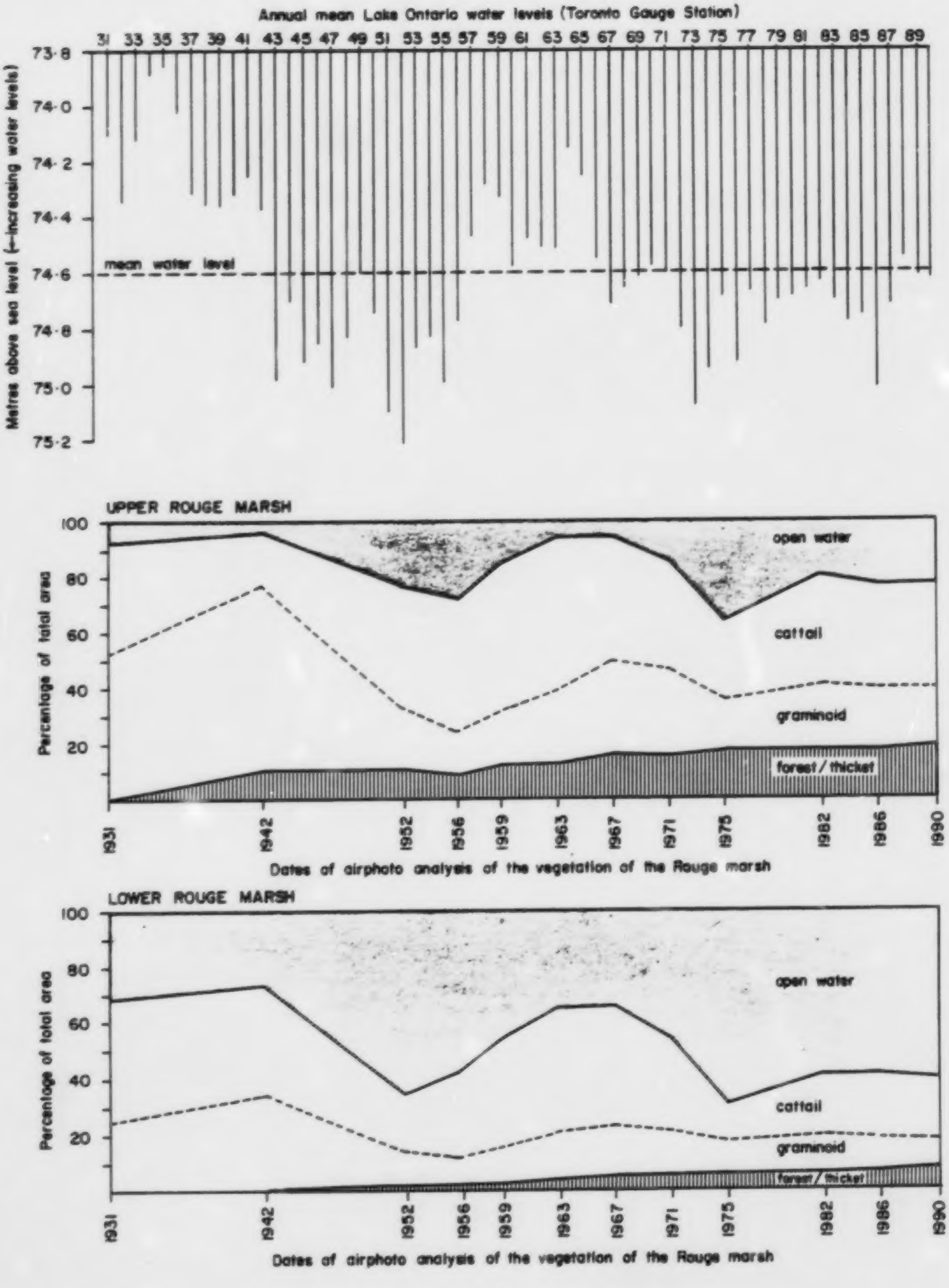


Figure 30. Extent of Rouge Valley Park lakefront marsh 1931-1990 correlated with annual mean Lake Ontario water levels (M.E.D.A. 1989).

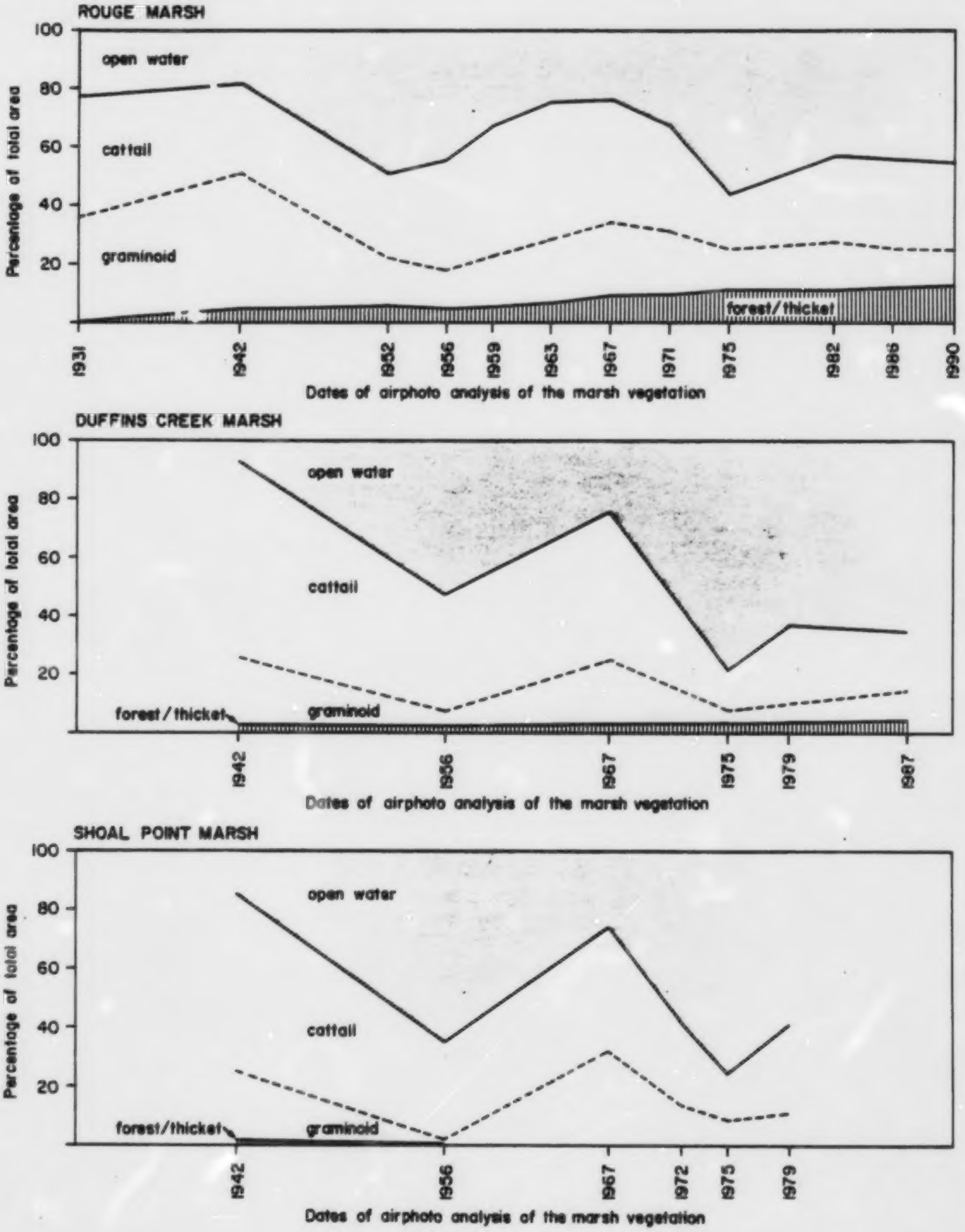


Figure 31. Comparison of the extent of different lakeshore marsh communities, 1931-1990, for the Rouge River, Duffins Creek and Shoal Point.

⬭	Open water (p = pond)
g	Graminoid marsh (h = hayed)
c	Cattail marsh
mf	Mudflat
sp	Submerged peat
t	Bottomland forest
bo	Bottomland opening
gb	Gravel bar
th	Thicket
f	Forested slope and tableland
gs	Graminoid slope
⊤c⊤	Cliff
fl	Fill
s	Beach strand (bare sand)
⊤⊤⊤⊤	Slope edge
)═(	Bridge
– – –	Footpath
= = =	Trail, unpaved road
══	Road
d⟍	Dock

Figure 32. Lakefront marsh dynamics in the Rouge Valley Park 1931-1990 correlated with Lake Ontario water levels.
(Based on airphotos from 1931, 1939, 1942, 1952, 1954, 1956, 1957, 1959, and 1961-1990. Years with significant marsh changes were selected. Water levels were determined by averaging recorded monthly mean levels at selected gauge locations in Lake Ontario from 1920-1990 (M.E.D.A. 1989).)

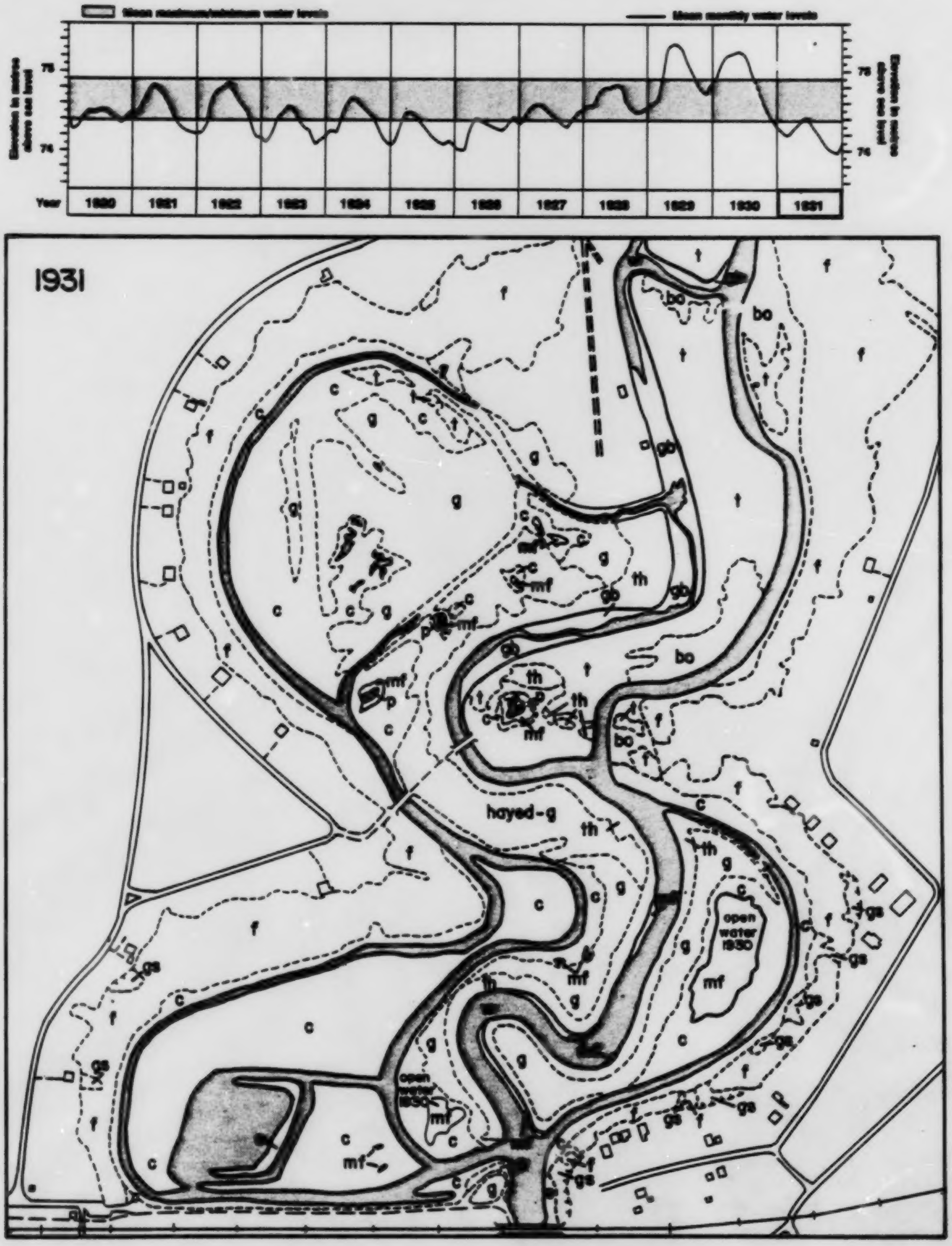

Mean maximum/minimum water levels
Mean monthly water levels
Elevation in metres above sea level
75
74
Year
1920
1921
1922
1923
1924
1925
1926
1927
1928
1929
1930
1931
1931
f
t
bo
c
g
gb
mf
th
p
hayed-g
open water 1930
gs

Figure 32a.

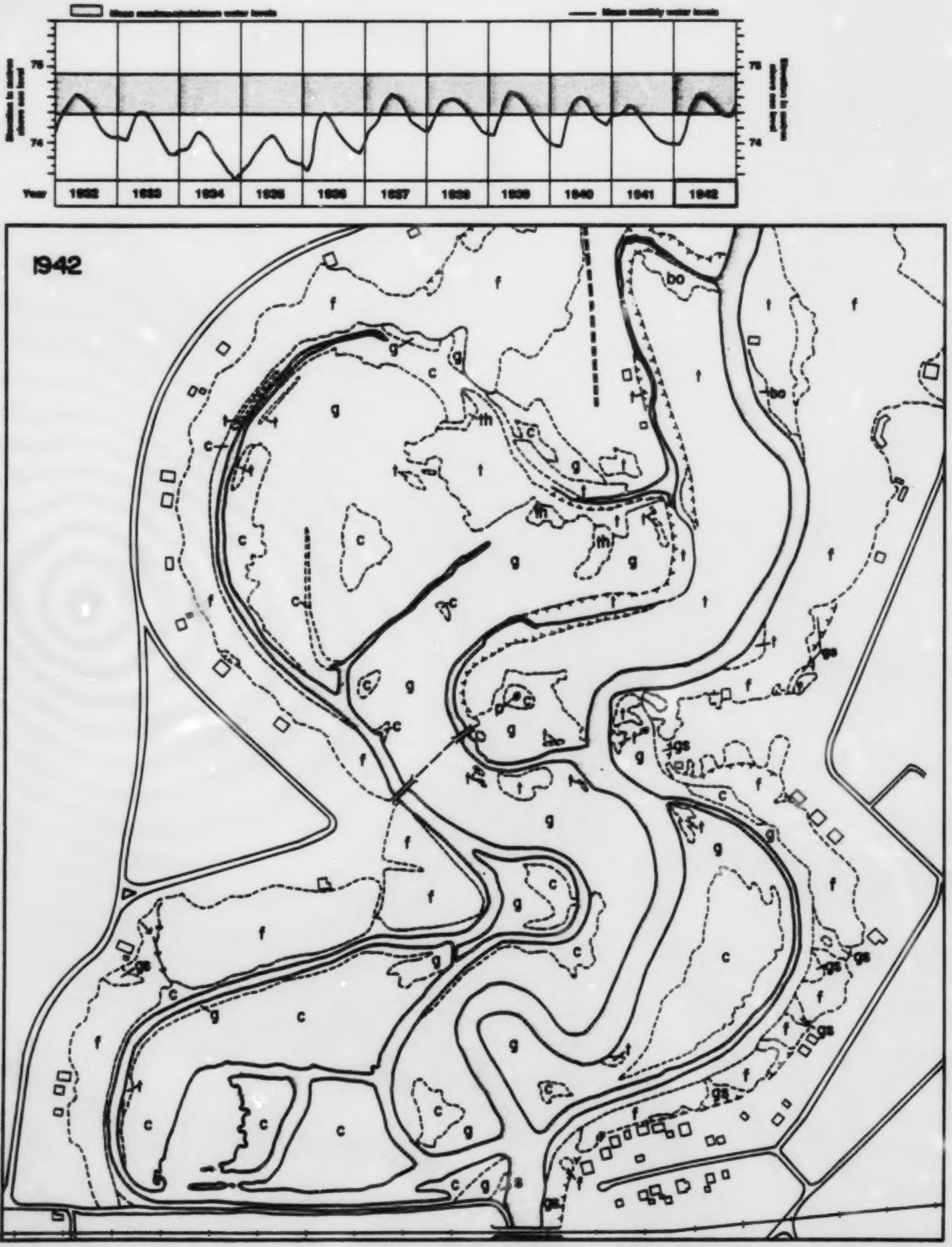

75
74
Year
1932
1933
1934
1935
1936
1937
1938
1939
1940
1941
1942
1942
f
g
c
t
bo
fh
gs
p

Figure 32b.

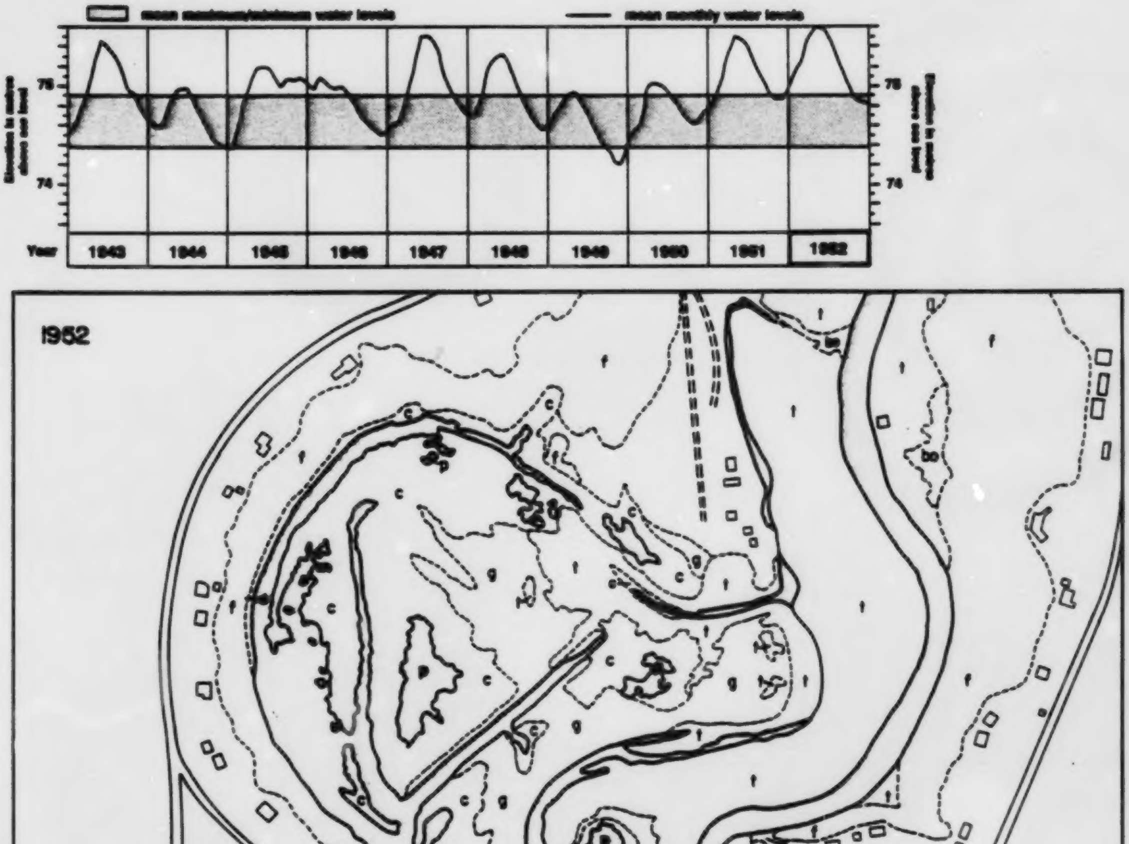

mean maximum/minimum water levels
mean monthly water levels
Elevation in metres above sea level
75
74
Year
1943
1944
1945
1946
1947
1948
1949
1950
1951
1952
1952

Figure 32c.

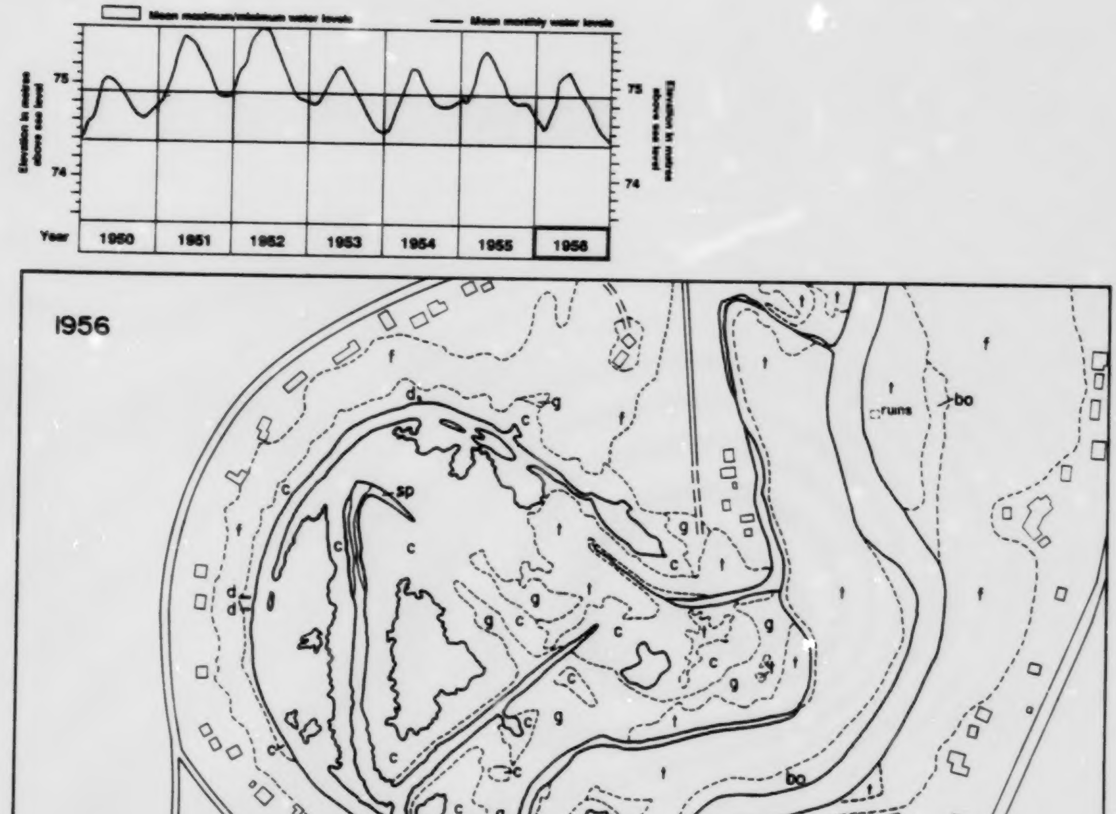

Mean maximum/minimum water levels
Mean monthly water levels
Elevation in metres above sea level
75
74
Year
1950
1951
1952
1953
1954
1955
1956
1956
f
d
g
c
sp
bo
ruins
gs
Line of Poplars
Railway Bank

Figure 32d.

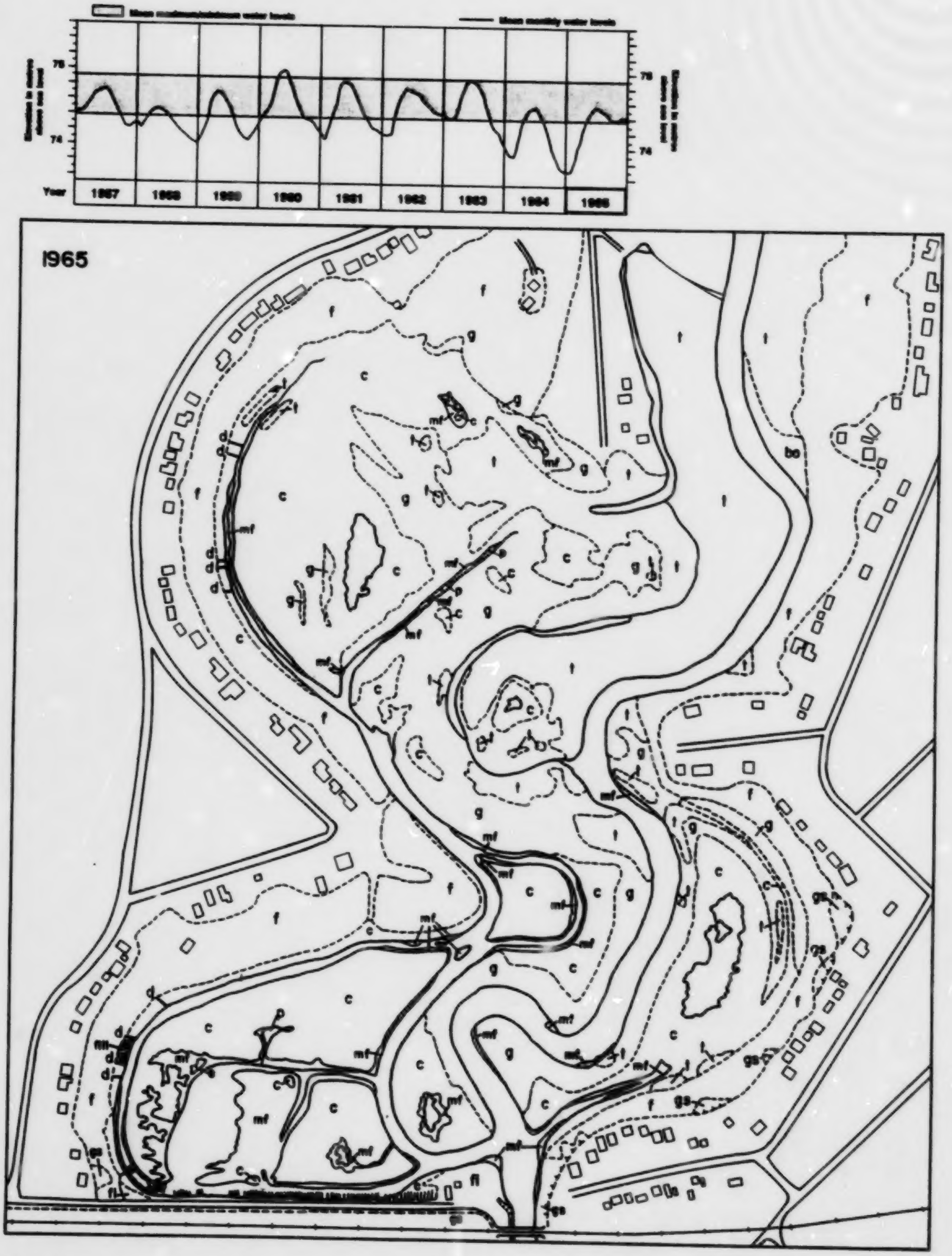
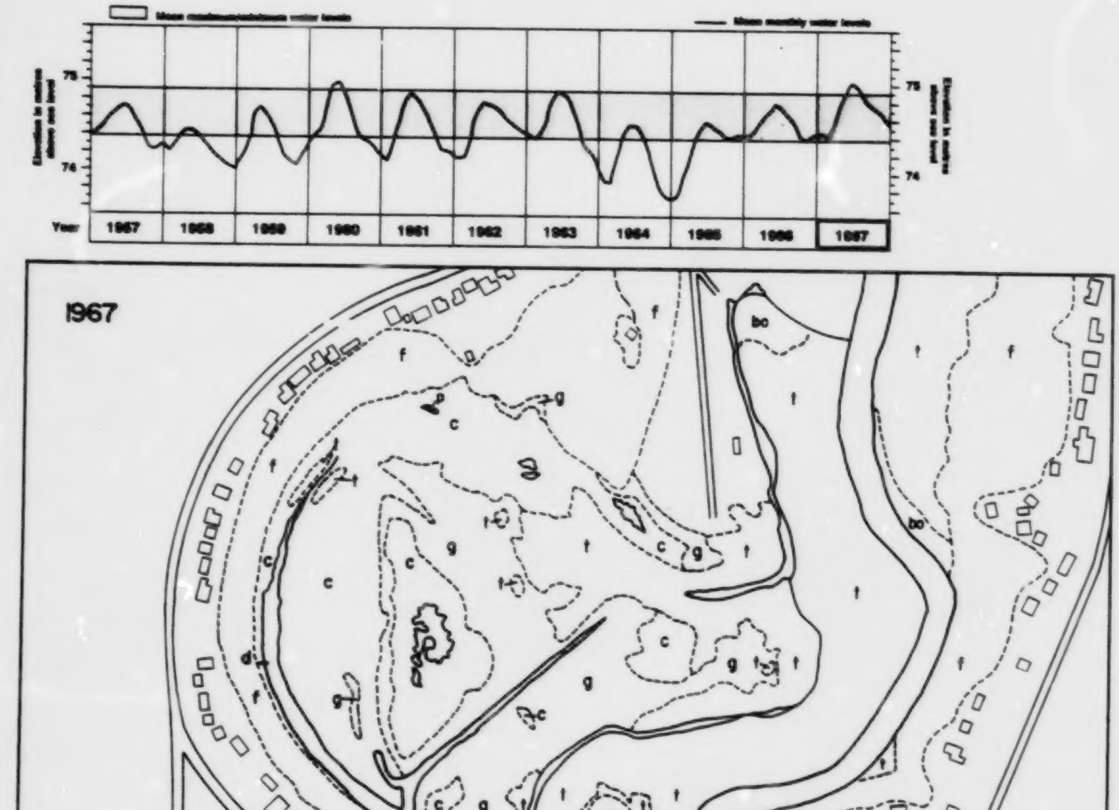

Mean maximum/minimum water levels
Mean monthly water levels
Elevation in metres above sea level
75
74
Year
1957
1958
1959
1960
1961
1962
1963
1964
1965
1965
f
g
c
mf
d
fl
gs
bo
p

Figure 32e.



Mean maximum/minimum water levels
Mean monthly water levels
Elevation in metres above sea level
75
74
Year
1957
1958
1959
1960
1961
1962
1963
1964
1965
1966
1967
1967
f
bo
g
c
t
d
gs
fl

Figure 32f.

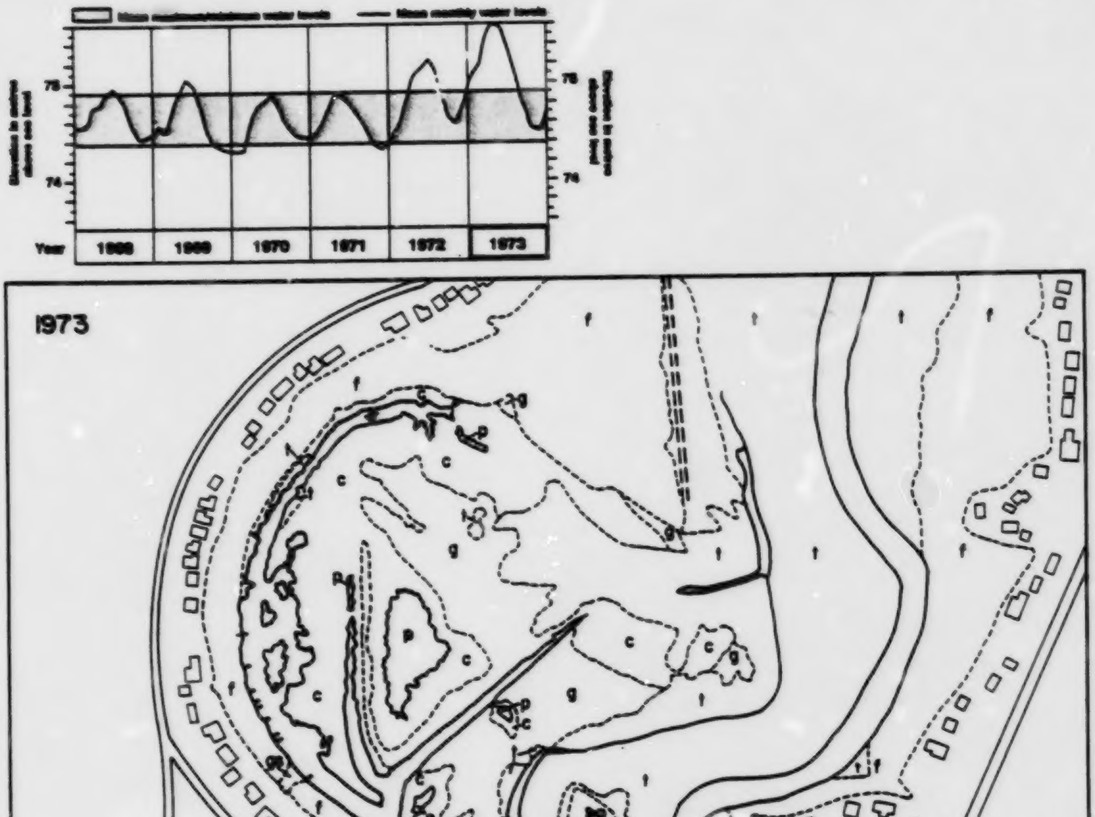

Mean maximum/minimum water levels
Mean monthly water levels
75
74
Year
1968
1969
1970
1971
1972
1973
1973
f
c
g
p
gs
road flooded

Figure 32g.

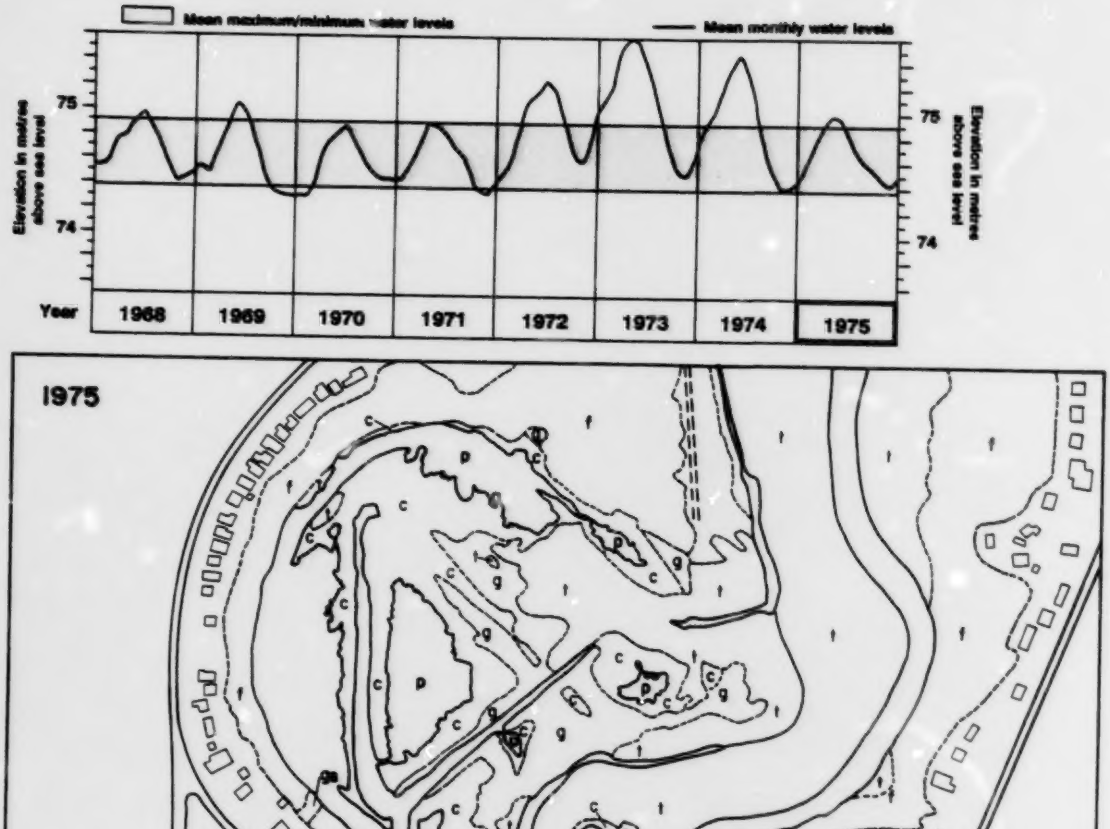

Mean maximum/minimum water levels
Mean monthly water levels
Elevation in metres above sea level
75
74
Year
1968
1969
1970
1971
1972
1973
1974
1975
1975
f
c
g
p
gs
Parking
Parking

Figure 32h.

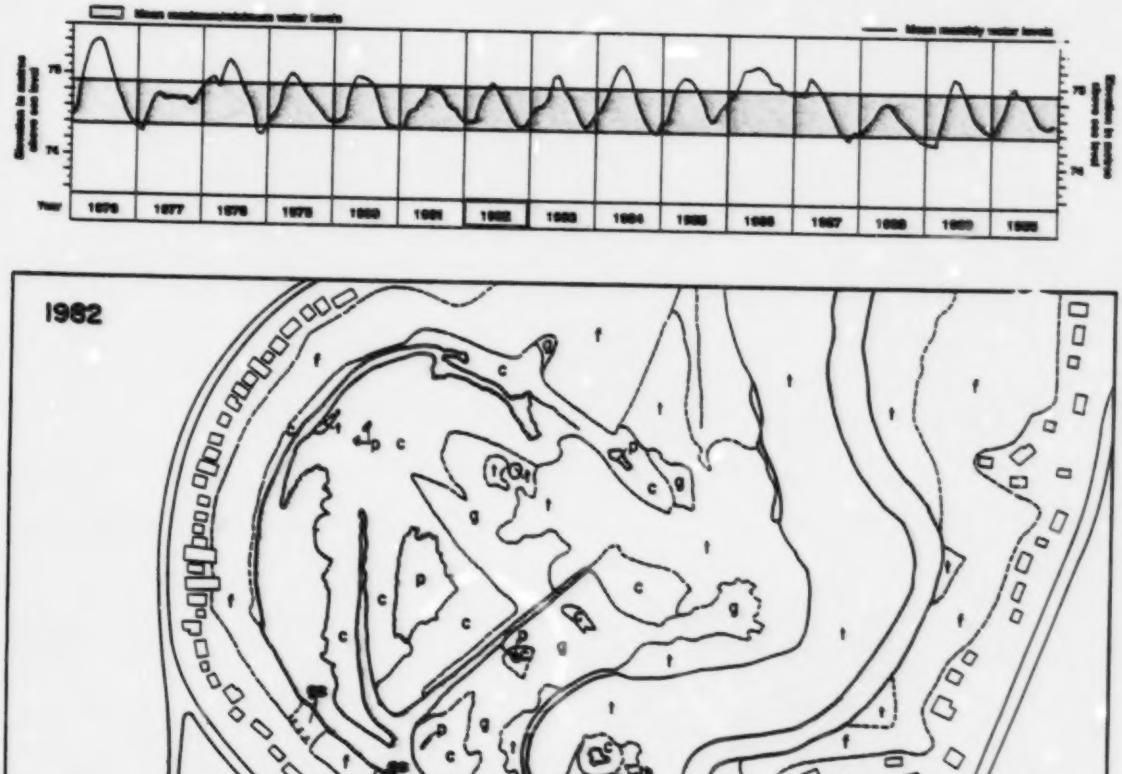

75
74
Year
1976
1977
1978
1979
1980
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1982
f
c
g
p

Figure 32i.

1961-67) and a lowering of water levels by up to 0.7 metres during high periods (i.e. 1967-88) (Figure 10-12 in Busch *et al.* 1989). The seasonality of highs and lows also appears to have been affected by regulation (Busch *et al.* 1989). The annual high during high water years occurred in June before regulation, and in May following regulation. During low winter years the annual high before regulation occurred in May, while after regulation it fluctuated from May to as late as June-July.

The 1.2 metre reduction in amplitude of Lake Ontario water levels since 1961 and the change in seasonal high and lows have affected the vegetation dynamics of Lake Ontario marshes. For example, dieback of cattail marshes was more extreme in unregulated Lake Erie during the high lake levels of 1967 to 1988 than they were in the partially regulated Lake Ontario. Continued regulation over the long term will decrease the area, and diversity and interspersion of Lake Ontario marshes in general.

The only historical evidence of the extent of the lakeshore marsh in the 18th and 19th centuries is a map by D.W. Smith from *ca.* 1793 (Fig. 3) and a surveyor's description (Galbraith 1833a). Both suggest that the marsh may have extended a further 300 m upstream of its present location. Galbraith (1833a) described a "wet marsh" with areas of deeper water supporting "Flags and Pond Lillys" along the 3rd Range line. The only area of bottomland forest was a narrow five metre band on the levees of the Rouge River which supported, "some small swamp ash [Black Ash] and alders". Today, this section of bottomland is a forest of Manitoba Maple and willows, with a few small open water pools and lost meanders.

The shrinkage in lakefront marsh area could be due to a number of factors: increased sediment deposition may have coincided with forest clearing in the watershed (Cecile 1983, for Oshawa Second Marsh) and may have filled the uppermost portion of the marsh allowing forests to invade; lake levels may have been higher during this period than in the 20th century; and the lakeshore barrier beach (before it was fixed in place by the building of the Grand Trunk railway in 1856) may have periodically closed off the outlet to the lake, allowing water to flood the back portions of the marsh, preventing invasion by woody species. This latter event was described by Galbraith in 1833, and occurs predictably at lakeshore marshes along northwestern Lake Ontario.

There is some evidence of a decline in community diversity at the Rouge lakefront marsh. In 1900 M. Wilkes collected Northern Wild-rice (*Zizania palustris*) from the Rouge marsh, suggesting the presence of deep emergent wild rice communities. Wild rice marshes were also known at that time from the Toronto Islands and the Humber River marshes. Today it is absent from those marshes and only four individual wild-rice stems remain in the Rouge lakefront marsh. Crowder and Bristow (1988) suggest that the loss of wild-rice emergent communities in Lake Ontario marshes at the Bay of Quinte are due to increased turbidity and decreased light levels associated with high sediment loads and eutrophication (inputs of sewage and agricultural runoff of nitrogen and phosphorus). Wild rice seedlings can't grow up from the bottom and are replaced by cattails which can grow out from shore as mats.

Aerial photographs from 1931 to 1990 provide an excellent overview of marsh dynamics in the lower Rouge. They were used to determine the extent of marsh communities over the past 60 years (Fig. 30), dividing the marsh into an upper portion (the northwest corner of the marsh) and a lower portion (the rest of the marsh). Nine critical years were chosen to illustrate this cyclic variability (Fig. 32) and these are related to monthly water levels.

1920 to 1942

The years from 1920 to 1942 marked the longest and most extreme period of low lake levels during the 20th century. Eight of the century's ten lowest annual water levels were recorded during this period, including the record lows in 1934 and 1935. The only break in this 22 year long trend were the two years of very high lake levels in 1929 and 1930.

This long period of low water levels resulted in relatively closed vegetation in the marsh by 1931 (Fig. 33a). By 1942, the lakefront marsh had reached its maximum extent of emergent cover, with only 28% of the lower marsh in open water and 6% of the upper marsh in open water (Fig. 33b). Areas of open water were largely restricted to the secondary river channels that cut through the marsh. In the marsh, the graminoid (drier) marsh community type was more prevalent than the cattail (wetter) marsh, particularly in the upper marsh.

1943 to 1956

The following 14 year period was the second longest phase of high lake levels during the 20th century. Five of the century's ten highest annual lake levels were recorded during this period, including the record high of 1952 (Fig. 33c).

With the onset of high water levels, the emergent marsh vegetation began to decline reaching a minimum during the record high lake levels of 1952. Over half the area of emergent marsh in 1942 was gone by 1952 from the lower marsh, and 21% was gone by 1956 from the upper marsh (Fig. 33d) (average of 37% for the entire marsh).

Most of this decline represented the loss of graminoid marsh as cattail marsh expanded into its former habitat, becoming the dominant marsh community type in 1952. In contrast, major ponds developed in the northwest and northeast corners of the marsh as open water increased to 45% in the lower marsh and 28% in the upper marsh.

1957 to 1967

This 10 year period of low lake levels reached 2 extreme lows, one in 1958 and the second in 1964 and 1965. The lows, however, were generally not as severe as those in the previous low phase of 1920 to 1942.

In lockstep with declining lake levels, the marsh vegetation exhibited a rapid recovery in only 7 years, with the extent of cattail and graminoid marsh levelling off by 1963. Recovery of the emergent marsh to the maximum 1942 values was achieved in the upper marsh, although the graminoid marsh type was still considerably below the 1942 values. The lower marsh, however, reached a maximum area still 10% below the values for 1942.

The dramatic effects of low lake levels are highlighted in the April 1965 marsh vegetation map (Fig. 33e). The near record lows in that month exposed extensive mudflats in the lower marsh. Surprisingly, the ponds in the northeast and northwest corners of the marsh retained their open water, apparently because the encircling cattail and peat mat acted somewhat as a dam, keeping in the higher water levels from the previous summer.

1967 to 1990

The 22 years between 1966 and 1987 represent the longest period in the 20th century of generally high lake levels. There are two peaks in water levels, a near record high in 1973 and a smaller one in 1986. Between these two peaks, water levels declined to near average conditions in 1982.

Correlated with the rise in water levels to the 1973 peak is an erosion of the area of cattail and graminoid marsh. The minimum area was reached in 1975 (Fig. 32h), two years after the extreme high of 1973 (Fig. 32g). Emergent marsh acreage declined by 54% in the lower portion and 30% in the upper portion, with the cattail community experiencing the most severe reduction. The 1975 minimum was even lower than the previous minimum extent of marsh in 1952, simply because the marsh had not recovered sufficiently during the low lake phase from 1957 to 1967.

Some increase of emergent marsh acreage was exhibited in 1982, a year of near average water levels (Fig. 32i). The marsh, however, has subsequently shown a slight decline in response to the high water levels of 1986.

The interpretation of aerial photographs, generally taken in the early spring, does not allow for an analysis of the effects of lake levels on the marsh's submergent and floating aquatic vegetation. However, observations since 1973 have shown a dramatic decline in the extent and diversity of the submergent marsh vegetation. Once common throughout the open waters of the marsh in 1973, submergent vegetation is now largely restricted to a small channel in the northwest portion of the marsh.

High water levels, such as the record high of 1973, are generally thought to encourage the expansion of submergent communities. However, the subsequent decline in submergents during the generally high water levels of the 1980s suggests that other factors, such as high turbidity levels, may be playing a role (Lemay and Mulamoottil 1980). Greater turbidity in the water column reduces photosynthetic capability. Persistent high water levels may also result in an incremental undermining of rooting mats and organic soils, increasing turbidity levels (Dieter 1990). Increases in sediments loadings during the building boom of the 1980s may have also compounded this natural rise in turbidity. (Dr. E. Crossman of the Royal Ontario Museum (pers. comm.) suggests that the possible role of bottom-feeding carp in increasing turbidity levels in lakeshore marshes may be exaggerated. In the Rouge marsh, the role of native bullheads may be as significant, given the marsh's species composition (Buchanan, pers. comm.).

LAKESHORE DYNAMICS

The Rouge Valley Park is noteworthy for sustaining a small natural shoreline that has also experienced dramatic changes in size and configuration. Several significant shoreline plant species are dependent on dynamic shorelines for their survival. The stabilization of shorelines along most of the Metro Toronto waterfront has increased the significance of the park's small natural shoreline.

Natural shoreline dynamics relate to the fluctuating Lake Ontario water levels, the direction of storms off the lake and longshore drift, and episodic flooding in the Rouge River watershed.

Shoreline sediments derive from sediments transported down the Rouge River and sediments drifting along the shore from lakeshore erosional sources (Eyles and Boyce 1991). Sediment drift along the north shore of Lake Ontario is dominantly from east to west, but it is locally reversed in the Rouge area. Here there is an eastward transport of sediments eroded from shoreline bluffs between the Rouge River mouth and the Scarborough Bluffs at East Point, 6 km to the southwest.

The early maps of *ca.* 1793, *ca.* 1797, and 1850-54 (Fig. 3, 4, 5), and the survey field notes of Galbraith (1833a) show that the eastward littoral drift of sands and the action of storms had built up a 600 m long barrier beach across the Rouge mouth, with a narrow river outlet near its western edge. Galbraith noted that the barrier beach varied in width from 7.5 to 8.8 m at the river outlet in 1833, and was 50 m wide at its eastern base. Like modern day analogues elsewhere on Lake Ontario, the Rouge barrier beach would have changed its shape and size, and outlets, in response to changes in runoff, lake levels and storm events. This is confirmed in Galbraith's 1833 description of the Rouge River outlet at the barrier beach:

> " ... the River Rouge running into the Lake with a swift current the water only a few inches in depth and about 2 chains [40 meters] in width it having been lately barred by a storm as it generally sets through the beach with a deep narrow channel."

The barrier beach, however, was stabilized in 1856 with the installation of the raised embankment of the Grand Trunk Railway on top of the beach. The river outlet was moved to the eastern edge of the barrier beach.

In spite of the lakeshore railway, aerial photographs from 1920 to 1990 exhibit a dynamic shoreline where ponds, meadows and forests come and go; beaches expand and contract by as much as 65 m in width; and buildings are washed away (Fig. 33). These changes largely correlate with fluctuating lake levels, although severe storms also must have played a role.

A number of significant species and early successional communities are restricted to these ephemeral shoreline habitats. They include plant species restricted to the Lower Great Lakes shorelines, such as the Great Lakes Sea Rocket, Seaside Spurge and Bushy Cinquefoil. Artificial stabilization of the shoreline usually results in their loss. The species are adapted to shifting sands, and are easily outcompeted by common species adapted to stable habitats, as has happened elsewhere along the shoreline of Metropolitan Toronto.

ca. 1920

On the east side of the rivermouth, the large pond ringed by cattail marsh, and the extensive meadows on the beach, suggest that most of the shoreline had been stable for a number of years (Fig. 33a). This correlated with a period of below average lake levels from 1920 to 1927.

1931 to 1942

On the east side, only a small pond and a surrounding meadow survived from the early 1920s through the high lake phase of 1929 and 1930. The large expanse of bare sand and the lack of cattails in the pond suggest these features formed at the beginning of the long period of low lake levels in the fall of 1930. During this low phase from 1931 to 1942, meadows expanded onto the bare sands, and the small pond finally filled in with sand. A long sand spit formed on the west side of the river mouth (Fig. 33b).

On the west side, south of the railway embankment, there was a wide beach which graded from bare shoreline sands into Eastern Cottonwood forests, meadows and a small pond, which was filled in by 1942. The only major change between 1931 and 1942 was an apparent shift of sands eastward with a resultant reduction of beach area below the shorecliff at the western edge of the Rouge park.

1952 to 1956

The period of high lake levels from 1943 to 1956 resulted in a gradual loss of beach, culminating in the elimination of 65 m of beachfront during the record high year of 1952 (Fig. 33b). The beach strand on the east side of the rivermouth was completely lost, and the lake was at the base of the forested slopes, causing a number of trees to fall in the lake.

Several boathouses and about 12 cottages where removed from the lakeshore during this period. Breakwaters were built around a remaining boathouse and water pumping station; and additional rock rubble was deposited at the base of the western side of the railway embankment for erosion control.

The large spit on the west side of the rivermouth which had existed since *ca.* 1940 was washed out by the floodwaters of Hurricane Hazel in 1954. Much of this sand appears to have been redeposited on the eastern edge of the Rouge mouth, forming by 1956, the last year of high lake levels, a prominent spit and a small pond (Fig. 33b).

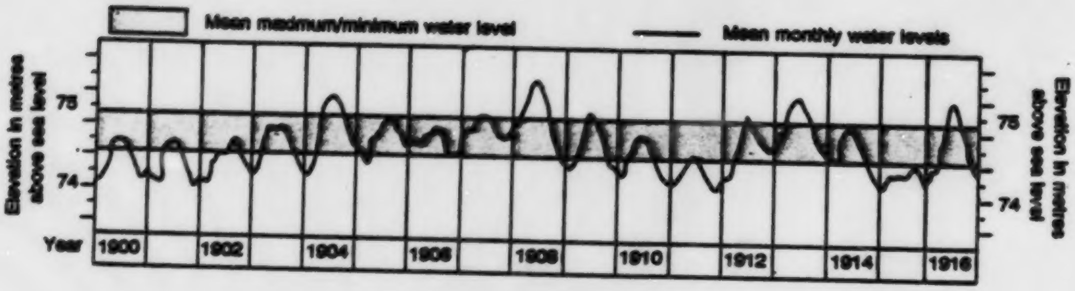
1959 to 1966

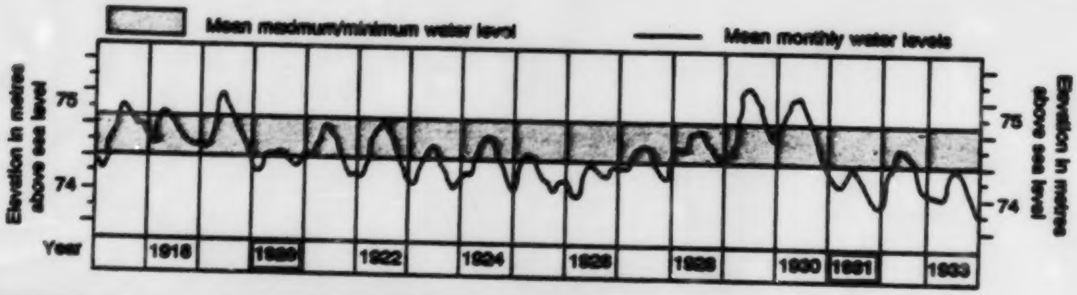
The lower than normal lake levels from 1957 to 1966 exposed 65 m of new beachfront by 1964, as well as a number of temporary ponds on the west side (Fig. 33c). On the east side, the spit which was initiated in 1956 continued to grow, closing in a large pond by 1961. In 3 years this large pond and an adjacent small pond were completely covered in cattail marsh. Around the ponds, meadow communities invaded the former bare sands.

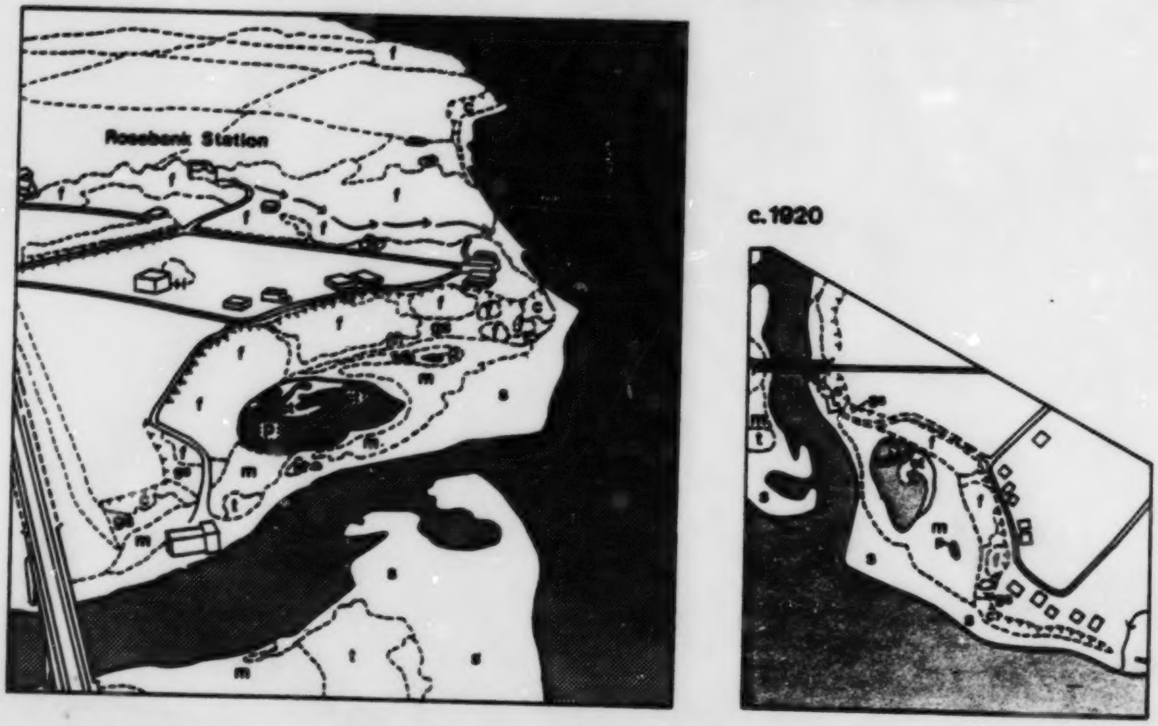
During this period, recreational activities increased greatly. The former meadows on the west side were replaced by a car parking lot, and a swimming pool was built in 1964.

⬭	Open water (p = pond)
ct	Cattail marsh
s	Beach strand (bare sand with scattered annual plants)
m	Beach strand vegetated (meadow, wet meadow, willow thicket)
wm	Wet meadow (wetter portion highlighted in c.1920 figure)
th	Willow thicket
t	Cottonwood – poplar woodlands
f	Forested slope
gs	Graminoid slope
⌒c⌒	Cliff
fl	Fill
R	Rubble breakwall
TTTT	Slope edge
—	Fallen tree
||||||||||	Row of poplars (probably planted Lombardy Poplar)
▬▬▬	Breakwall
═══	Road
===	Trail, unpaved road
– – –	Footpath
d⌐	Dock

Figure 33. Lakeshore dynamics in the Rouge Valley Park 1920-1990, correlated with Lake Ontario water levels. (Based on an oblique air photo *ca.* 1920 and airphotos from 1931, 1939, 1942, 1952, 1954, 1956, 1957, 1959, and 1961-1990. Years with significant shoreline changes were selected. Water levels were determined by averaging recorded monthly mean levels at selected gauge locations in Lake Ontario from 1900 to 1990 (M.E.D.A. 1989).)






c.1920

Rosebank Station
f
m
s
t
c

Figure 33a.

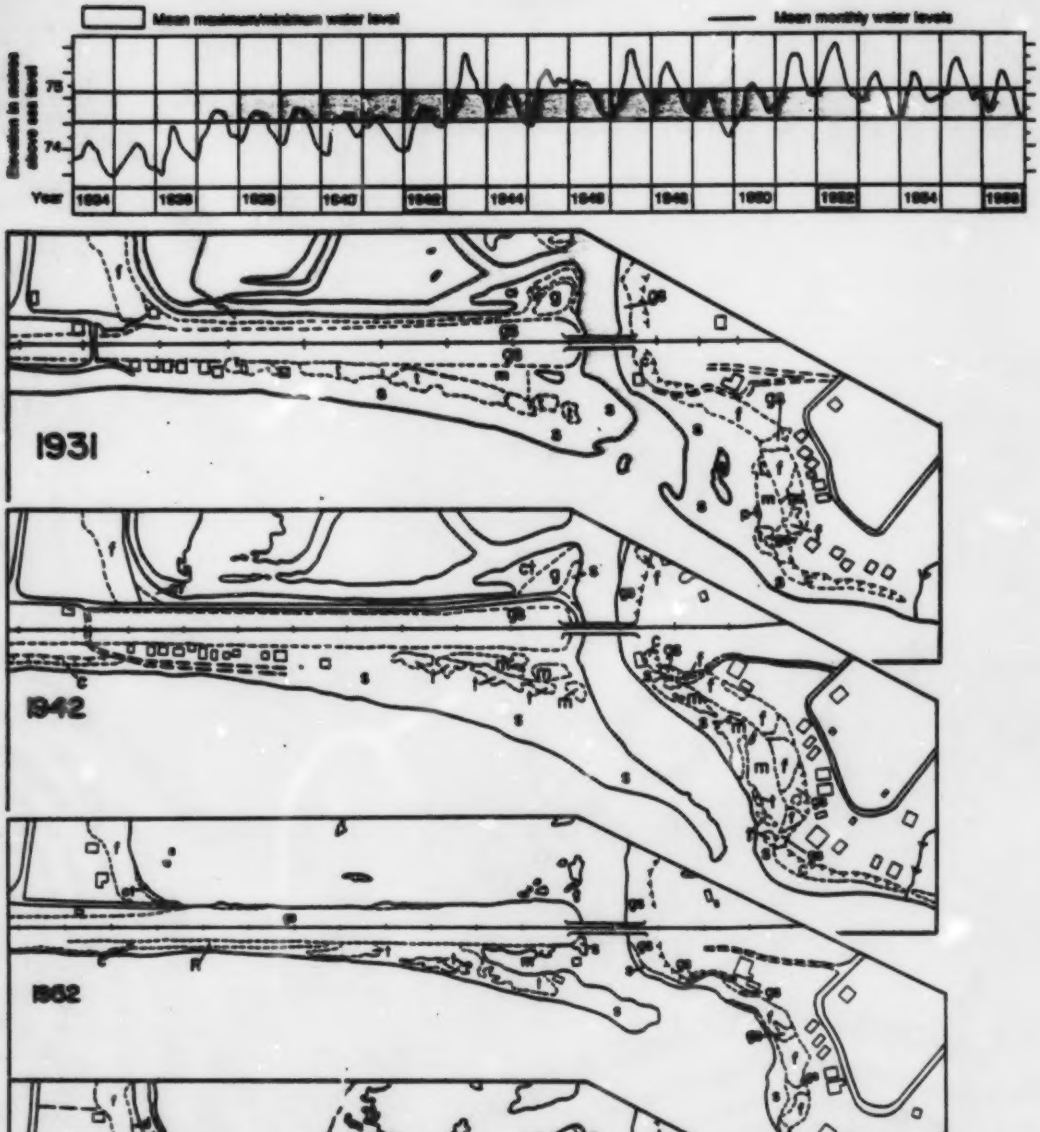

Mean maximum/minimum water level
Mean monthly water levels
Elevation in metres above sea level
75
74
Year
1934
1936
1938
1940
1942
1944
1946
1948
1950
1952
1954
1956
1931
1942
1952
1956
row of poplars
Railway Bank

Figure 33b.

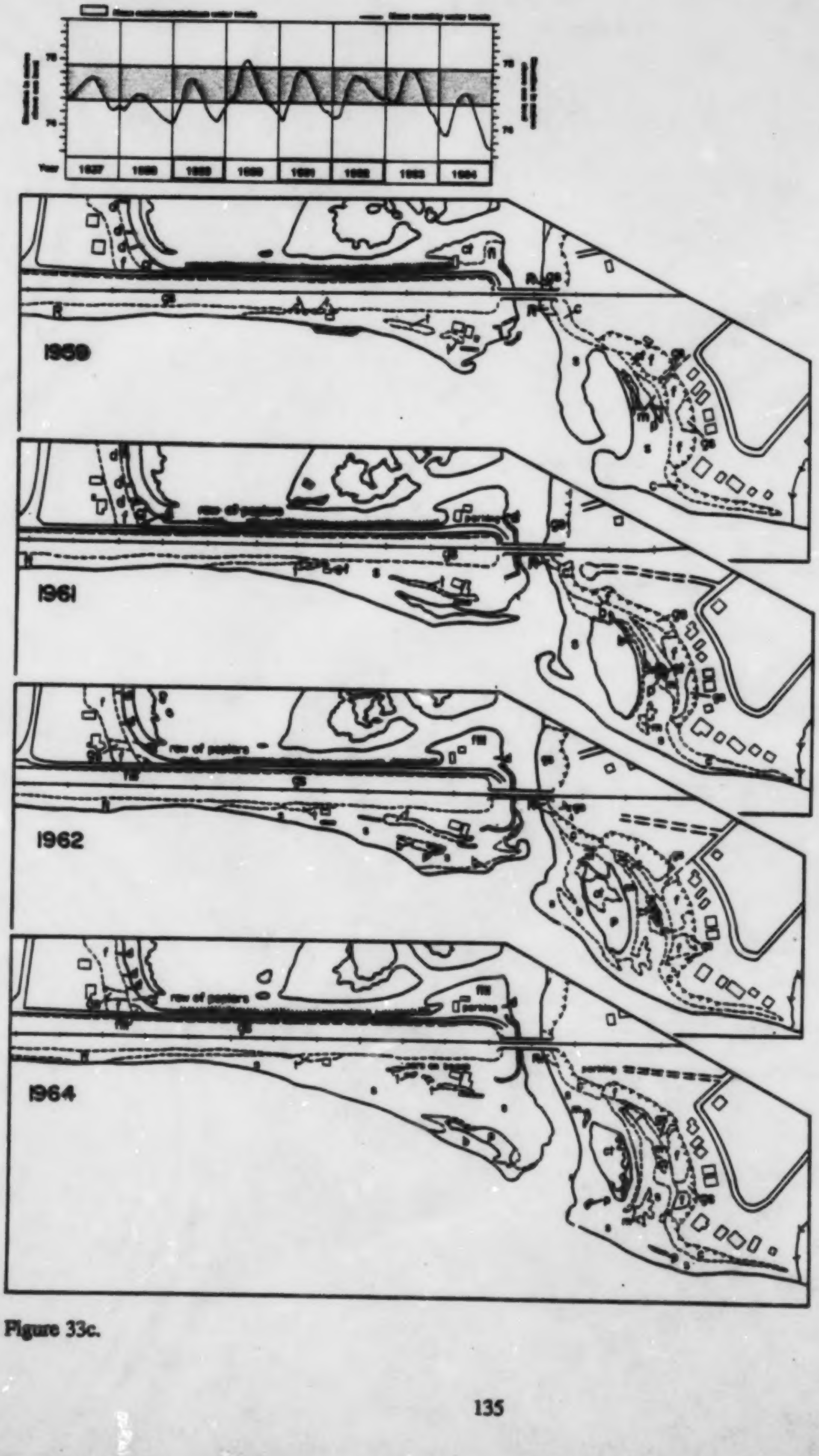

Year
1957
1958
1959
1960
1961
1962
1963
1964
1959
1961
row of poplars
parking
1962
row of poplars
fill
1964
row of poplars
fill
parking

Figure 33c.

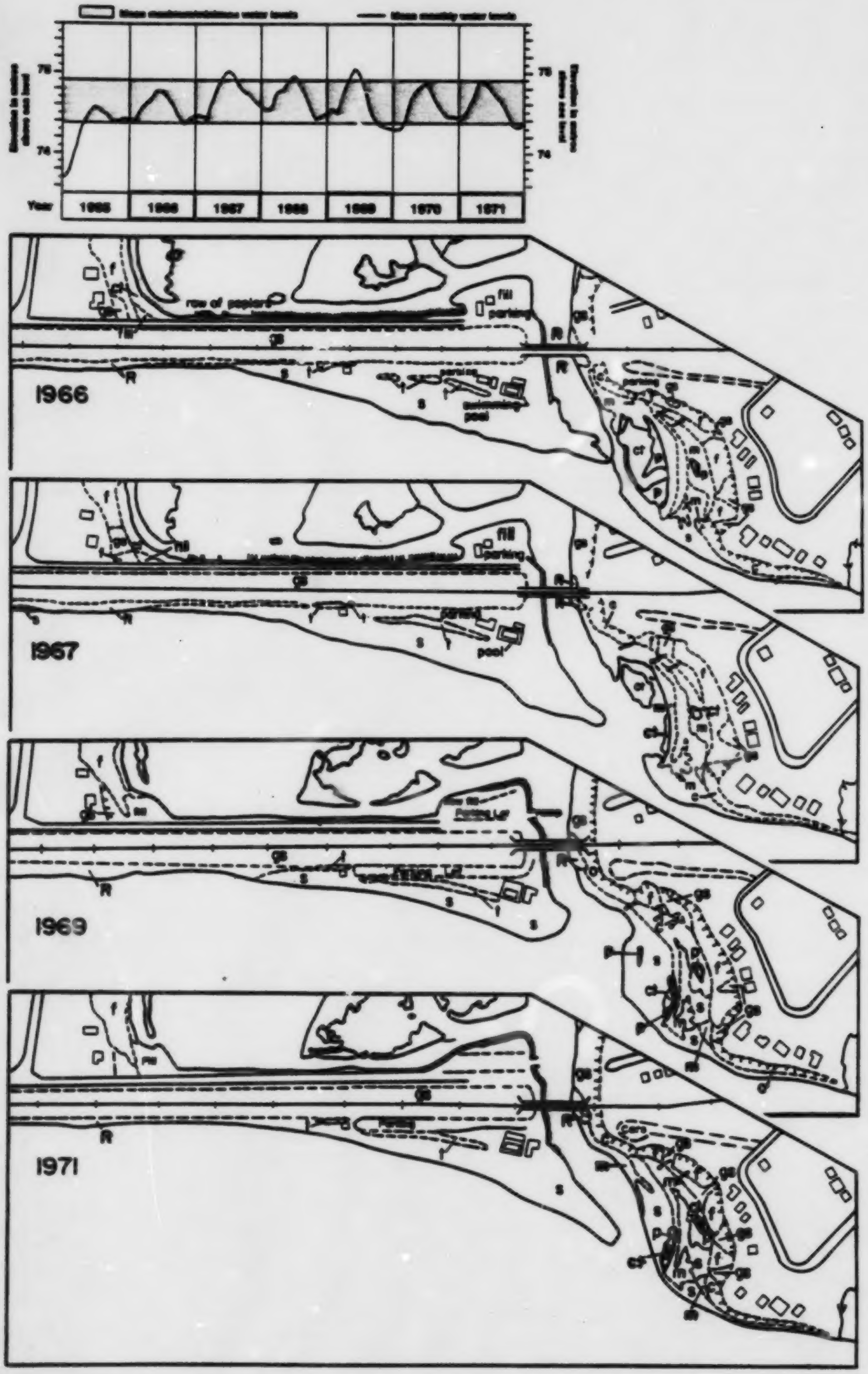

75
74
Year
1965
1966
1967
1968
1969
1970
1971
row of poplars
fill
parking
1966
swimming pool
1967
pool
1969
Parking Lot
1971
R
s
f

Figure 33d.

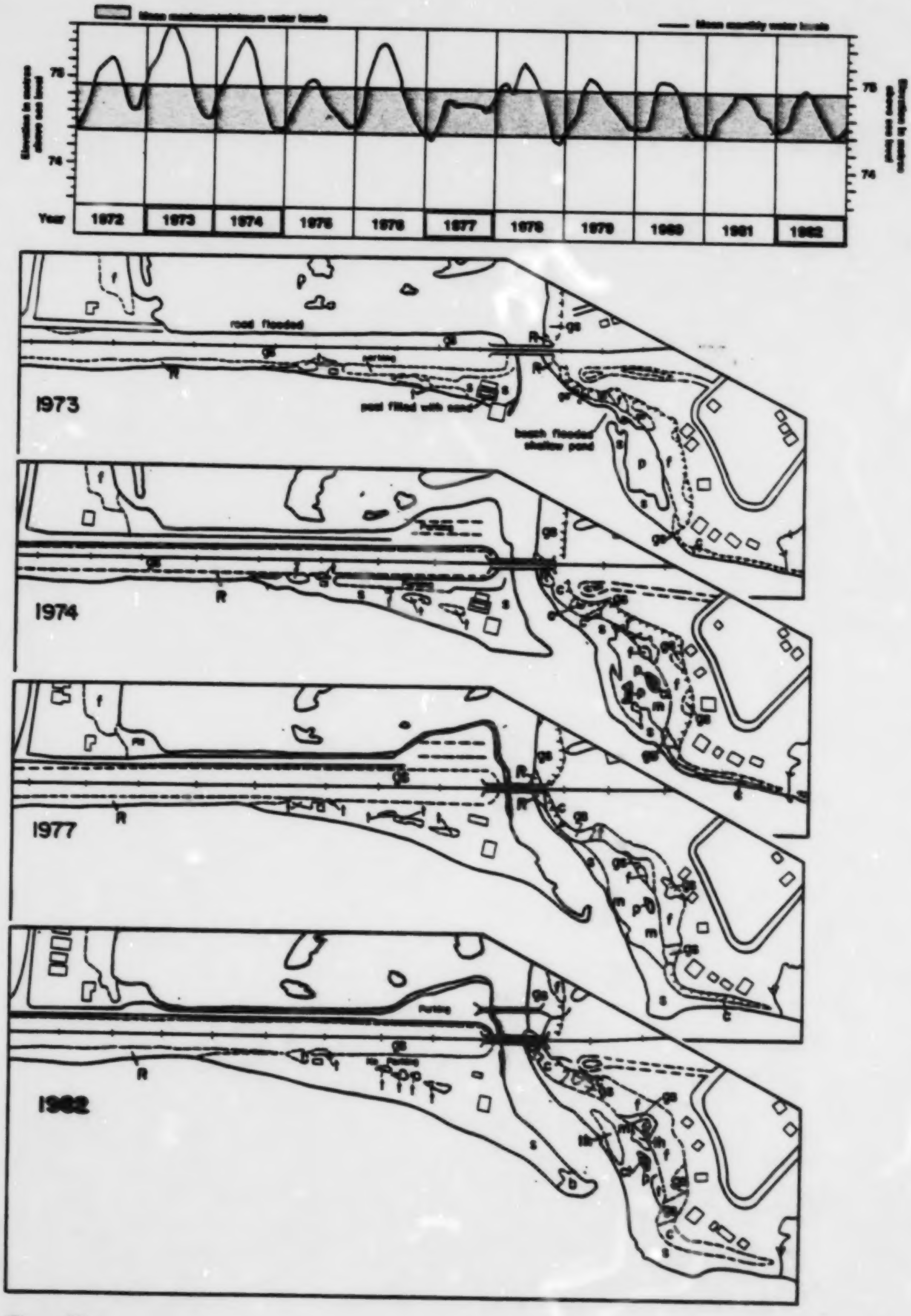

Mean maximum/minimum water levels
Mean monthly water levels
Elevation in metres above sea level
75
74
Year
1972
1973
1974
1975
1976
1977
1978
1979
1980
1981
1982
road flooded
gs
R
parking
pool filled with sand
beach flooded shallow pond
p
f
s
c
m
b
1973
1974
1977
1982
Parking

Figure 33e.

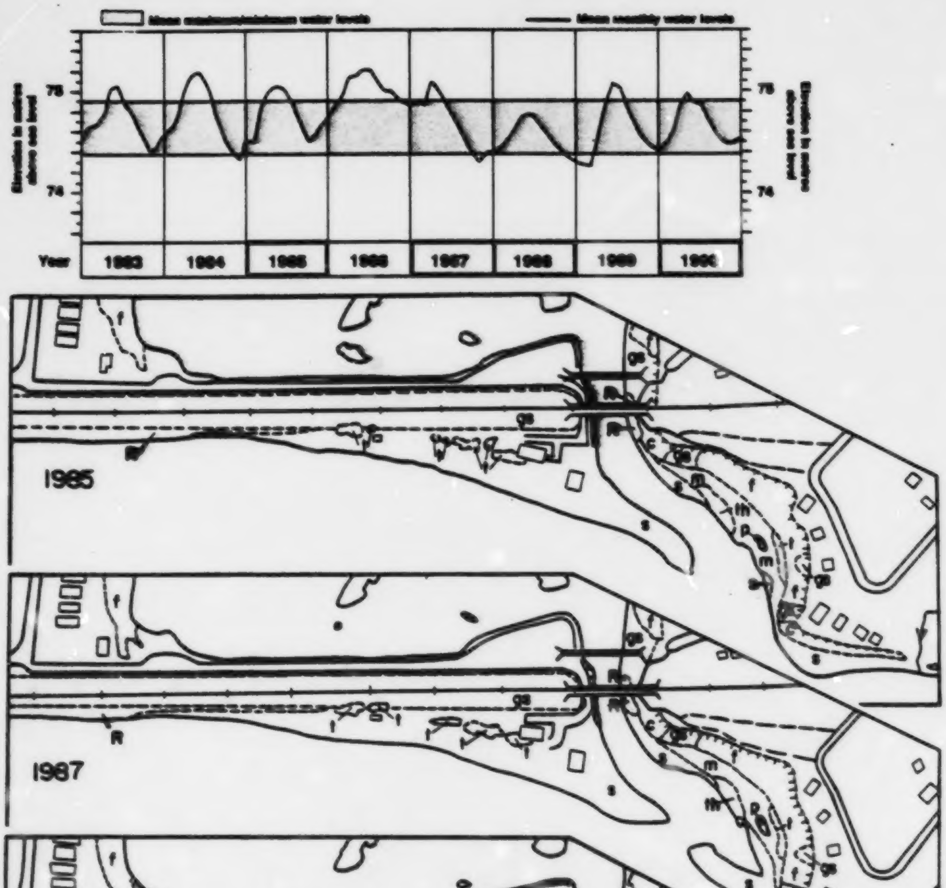

Mean maximum/minimum water levels
Mean monthly water levels
Elevation in metres above sea level
75
74
Year
1983
1984
1985
1986
1987
1988
1989
1990
1985
1987
1988
1990
f
gs
R
s
c
m
fm
p

Figure 33f.

1967 to 1986

This twenty year period of relatively high lake levels witnessed a gradual retreat of beachfront with a maximum loss of 50 meters during the near record water levels of 1973 (Fig. 33e). At this time, the lake covered the swimming pool, and the road to the beach was underwater. A spit began to develop again on the west side of the Rouge mouth, as it had during the period from 1940 to 1954.

Changes on the east side of the Rouge mouth were also dramatic. The barrier beach around the large pond and cattail marsh was breached in 1967 (Fig. 33d), leaving only a small remnant pond which survived until 1975. The beach was gradually eroded away, briefly flooded during the near record 1973 levels, and reached its minimum extent in 1986. This resulted in a substantial loss of meadow, thicket and beach strand vegetation.

1987 to 1990

In the summer of 1987, water levels began to fall below or near average levels. At this time a spit developed on the east side of the Rouge mouth which lasted for 3 years (Fig. 33f). Much of the sand appears to have shifted westward from a large sand mass that had existed since 1977 at the foot of the cliffs east of the Rouge mouth.

During this phase, populations of beach strand plants peaked in abundance following their very low numbers in 1985 and 1986. Significant species such as Bushy Cinquefoil, Seaside Spurge, Great Lakes Sea Rocket and Engelmann's Nut-grass were all common on the new spit. The embayment behind the spit supported by 1989 a dense bed of Bullhead Waterlilies.

The spit and the floating aquatic community disappeared in 1990, probably due to rising lake levels and winter storms.

CHAPTER III: PLANNING CONSIDERATIONS

i) SIGNIFICANCE OF THE ROUGE VALLEY PARK

The lower Rouge River valley has long been recognized as a significant natural area. The first study of the watershed as a whole, with specific information on the lower Rouge, was the Rouge, Duffin, Highland and Petticoat Conservation Report of 1956, subsequent to the devastating flood brought by Hurricane Hazel on 15 October 1954, convincing proof of the sensitivity of the short, steep river valleys along the north shore of Lake Ontario.

The R.D.H.P. report outlined the new concept of managing lands on a watershed basis, and recommended soil conservation, rehabilitation of stream fisheries, reforestation, and the public acquisition of valleylands. It prophetically advocated the creation of a 600 ha Rouge River Conservation Area (Fig. 8), a public park extending from Lake Ontario north to today's Beare Road landfill, with adjacent tablelands acquired as a buffer for the valley.

> "This area contains **the choicest block of natural unspoiled wilderness in the lower reaches of any of the valleys of the R.D.H.P. watersheds.** Such an irreplaceable area should obviously not be split into small private estates and securely fenced to exclude the general public. Because of the interesting physical, botanical and zoological patterns, this conservation area offers the best possibility of any of the valleylands immediately adjacent to Metropolitan Toronto for the development of **a large-scale wilderness parkland and nature preserve.**" (Emphasis added.)

This report also advocated expansion of the park up to Steeles Avenue at a future date. Based on this vision, the Metropolitan Toronto and Region Conservation acquired much of the valleylands as parkland.

More detailed resource inventories have focussed on the lower Rouge since 1973, when MNR undertook a biological survey of the area valley south of Highway 401 (Wainio *et al.* 1973a), and of the significant shoreline marshes of central Lake Ontario (Wainio *et al.* 1973b). The Metropolitan Toronto Parks and Property Department undertook primary field studies in the lower Rouge in 1974 (Kaiser and Copeland 1974a,b).

A guide to the vascular plants and wildlife of the valley in Metropolitan Toronto and Durham Region was published in 1978 (Riley 1978), followed by numerous general interest articles and updates to that guide (Varga 1980a,b,c,d, Riley *et al.* 1981, Harpley 1982a,b,c). Research projects were initiated on a number of subjects, such as the lower valley's White Pine stand (Riley and Varga 1980), its forest composition (Varga 1984) and two of its rare plant species, Shining Ladies'-tresses (*Spiranthes lucida*) and Shy Bulrush (*Scirpus verecundus*) (Brumelis 1980s).

The resource information from these and other studies were evaluated with respect to the identification of Environmentally Significant Areas (ESAs) in the lower valley and on the adjacent tablelands (Riley 1980, MTRCA 1982, Varga 1982, City of Scarborough 1983). The Metropolitan Toronto and Region Conservation Authority selected ESAs in the Rouge River valley as those sites meeting one or more of seven biotic and abiotic selection criteria. The City of Scarborough selected ESAs on the tablelands adjacent to the Rouge, using the same selection criteria. Twenty-one Environmentally Significant Areas were identified in the park study area by this process (Fig. 34), covering *ca.* 690 ha.

The Ministry of Natural Resources published a series of reviews and assessments of significant natural areas across southcentral Ontario in 1984. These Areas of Natural and Scientific Interest (ANSIs) were defined as "areas of land and water containing natural landscapes or features which have been identified as having values related to protection, natural heritage appreciation, scientific study or education" (ANSI Policy, 1983).

Legend

Metro Toronto and Region Environmentally Significant Areas

1	Rouge Lakeshore Swale
2	Rouge Marsh
3	Little Rouge Forest
4	Rouge River - Whitby Formation Section
5	Tabor's Horsetail Meadow
6	Pearce Woods
7	Diller Woods
8	Woodlands
9	Core Woods
10	Morningside Creek Forest
11	Milne's Forest

Scarborough Natural Areas

10	Morningside/Rouge Valley
11	Rouge Finch Meander
12	Sewells Forest - East
13	Sewells Forest - West
14	Sewells Forest - North
15	Cedarbrae Woods
16	Reesor Woodlot - East
17	Meadowvale Woodlots
18	Barkey Woods
19	Townline Swamp
20	Beare Road Woodlot
21	Centennial Forest and Swamp (outside park)

Carolinian Canada Site

1,2,3,10/11	Rouge River Valley

Wetlands

2	Rouge River Marshes
21	Rouge Park Swamp (outside park)
22	Townline Swamp Complex (partially in park)

Figure 34. Significant natural areas identified in the vicinity of the Rouge Valley Park, other than Areas of Natural and Scientific Interest.

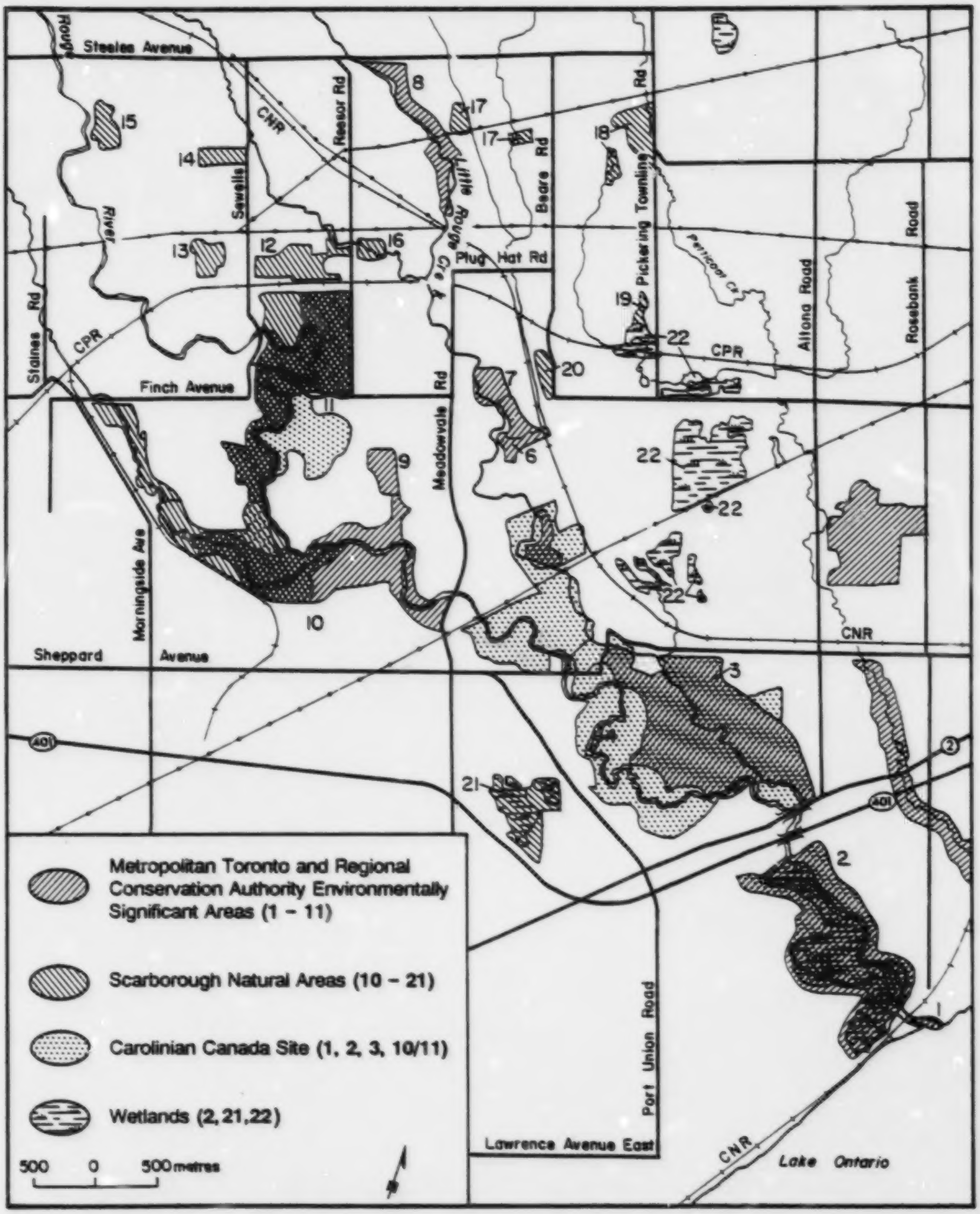

Steeles Avenue
Rouge River
CNR
Reesor Rd
Sewells
Little Rouge Cr.
Beare Rd
Pickering Townline Rd
Petticoat Cr.
Plug Hat Rd
Staines Rd
CPR
Finch Avenue
Meadowvale Rd
Altona Road
Rosebank Road
Morningside Ave
Sheppard Avenue
401
2
Port Union Road
Lawrence Avenue East
Lake Ontario
1
2
3
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
Metropolitan Toronto and Regional Conservation Authority Environmentally Significant Areas (1 - 11)
Scarborough Natural Areas (10 - 21)
Carolinian Canada Site (1, 2, 3, 10/11)
Wetlands (2, 21, 22)
500 0 500 metres

Figure 34. (continued)

The objective of the ANSI program is "to protect provincially significant elements of the natural landscapes of Ontario" (Provincial Parks Policy, 1978). To meet this objective, the Ministry undertook province-wide surveys of natural areas to identify a system of areas representing the full spectrum of natural landforms, environments and biological communities in Ontario.

Life science or ecological ANSIs contain relatively undisturbed vegetation and landform ecosystems, and their component species and communities. The review and assessment of significant natural areas, which resulted in the identification of the lower Rouge valley (Hanna 1984), was based on:

i) A **natural feature analysis** of the major **vegetation and landform** themes of **site district** (or **ecodistrict**) 7-4, encompassing the Regional Municipalities of Metropolitan Toronto, southern Peel, southern York, southeastern Halton and southwestern Durham. (A **site district** is defined as an area with a characteristic pattern of physiographic features (Hills 1959), in this case predominantly a plain of water-laid and ice-laid deposits (Figure 1, inset). Together, a number of site districts make up a **site region**, an area of land within which the response of the vegetation to the features of the landform follows a consistent pattern. Site region 7 corresponds to the eastern deciduous forest region' and the 'Carolinian zone', at the eastern edge of which is located the lower Rouge valley.)

ii) **Assembly of available background information** on the natural features and areas within the site district.

iii) Identification of significant natural areas, which meet the criteria of **representation, diversity, ecological functions, condition and special features.**

iv) Comparison of significant areas sharing similar vegetation and landforms, and **selection of the sites which best represent those vegetation-landform features.**

The sites identified as best representing those features were identified as provincially significant life science ANSIs and the remaining sites, meeting the same selection criteria, are identified as regionally significant life science ANSIs. The provincial ANSIs are identified as significant natural resources in the O.M.N.R. Maple District Land Use Guidelines (1983).

Parts of the lower Rouge River valley were identified as ANSIs representing major vegetation-landform themes of site district 7-4, and fulfilling the five selection criteria:

Theme	Site
WETLANDS	
River/Lakefront Marshes	Lower Rouge Marshes 30M/14 510508
RIVER VALLEY SYSTEM	
Iroquois Plain	Rouge River Central Valley 30M/14 490520
	Finch Avenue Meanders 30M/14 450450
	Morningside Tributary 30M/14 455522

Of these four areas in the Rouge, with a combined area of *ca.* 350 ha, two were selected as provincially significant ANSIs, best representing the features for which they were selected; the Lower Rouge Marshes and the Rouge River Central Valley.

During this evaluation, additional information was brought to the author's attention, and the Rouge River Valley South of Finch Avenue (30M/14 452535) was additionally recommended as a 'Site Requiring Field-checking and Evaluation' (Hanna 1984, pp. 11, 55). Although not fulfilling all selection criteria, another Rouge site, the

Rouge Rivermouth Beach, was identified as a 'Site Requiring Further Evaluation and Possible Protection as a Special Area', because of the occurrence there of increasingly rare Lake Ontario shoreline beach and swale communities.

As a result, significant natural areas were identified as provincial and regional ANSIs from Lake Ontario as far north as the CPR tracks north of the Finch Avenue meanders of the Rouge River.

A related conservation initiative has been the Carolinian Canada Project, which identified the provincial and regional ANSIs of the lower Rouge valley as a 'critical unprotected natural area in the Carolinian life zone of Canada' (Eagles and Beechey 1985). Collectively, these sites were considered to fulfill at least six of ten selection criteria: representation, high diversity, rare or endangered species, remnant communities, linkage and significant landforms.

The lower Rouge is located at the northeastern edge of the Carolinian life zone, elsewhere called the eastern deciduous forest region or site region 7 (Allen *et al.* 1990), and contains forests which are typical of the Carolinian life zone. Carolinian forests are distinguished by their high diversity of southern hardwood and shrub species (Fox and Soper 1952, 1953, 1954; Soper 1956, 1962), but the maple, beech, and hemlock forests of the Rouge are also typical of the cooler, moister sites of the Carolinian life zone (Maycock 1963).

Two provincially significant wetlands have been evaluated in the Rouge Valley Park study area (Fig. 34); the lower Rouge lakeshore marshes and the Townline Swamp wetland complex, of which two sections occur in the park, northwest of the C.P.R. line and the Pickering Townline, and between the townline and the C.N.R. rail south of the Beare Road landfill.

One of the objectives of the ANSI program is to document as fully as possible the natural features of identified ANSIs, to encourage their appropriate understanding and management. This inventory project and report stem from that commitment. As a matter of course, detailed inventories re-evaluate the ANSI selection criteria and the original boundaries recommended for the sites. With the accumulation of site information over time, it was clear that, in particular, the boundaries of the ANSIs in the Rouge required re-evaluation. Six individual but, in some cases, linked ANSIs, as well as 21 Environmentally Significant Areas, a Carolinian Canada site and provincial wetlands had been identified in the river valley system south of Steeles.

Regional Significance of the Rouge Valley Park

Collectively, the lower Rouge valleys, lakeshore marshes and adjacent tablelands form the most significant system of linked natural areas along any of the lower river valleys draining into northwestern Lake Ontario. The natural areas of this large park (1055 ha) comprise the largest **core natural area**, by far, of any park in the Greater Toronto Area or in site district 7-4. As such, the area is an important reservoir of species diversity, from which range expansions occur out of valley areas to colonize adjacent natural areas or regenerating habitats on nearby tablelands.

Because of the configuration of these natural areas along the lower Rouge River, the Rouge Valley Park also represents one of very few substantive **corridors of natural open space** extending from the northwestern shore of Lake Ontario towards the interior of Halton, Peel, York, Durham or Metropolitan Toronto. To the west the nearest extensive corridor area is in the vicinity of Cootes Paradise northward through links to the Niagara Escarpment.

Other natural corridors in the intervening, continuous metropolitan area of Burlington, Oakville, Mississauga, Toronto and Scarborough include the Bronte and Oakville Creeks, the Credit, Humber and Don Rivers, and Highland Creek. East of the Rouge extends the metropolitan area of Pickering, Ajax, Whitby and Oshawa, with Petticoat, Duffin, Oshawa, Farewell and other creeks crossing them to the lake. A number of these natural corridors are important links in the landscape, providing important wildlife highways. Some have a high proportion of natural vegetation on their slopes and bottomlands, such as the Credit and Humber Rivers in particular. However, even these are much less continuous to Lake Ontario than the Rouge. Many of the river and stream corridors are also engineered for stormwater runoff and flood management.

The Rouge Valley Park represents a very wide and diverse corridor of significant natural heritage features and open space from Lake Ontario, through the heartland of Scarborough and Pickering, to the central Rouge watershed in the Regional Municipality of York.

The Rouge River and its valleys are exceptional among the watercourses of the region from several points of view. The first of these is the **scale** of this corridor. The Rouge River and Little Rouge Creek join together about 1.75 km north of Lake Ontario. The 1.75 km of valley downstream of this confluence is relatively narrow, averaging 0.6-0.7 km in width, but this valley is predominantly floodplain forests and lake-level marshes, and its interior areas are surprisingly isolated from adjacent residential areas. Northwestward from there 7.5 km to Steeles Avenue, the valley-to-valley corridor averages 2 km in width, with an additional 1.5 km northeastward to the Pickering Townline.

Regionally (and provincially), the Rouge Valley Park contains a remarkable **diversity of natural and rural heritage features**. In the proposed park, 47% has been identified as natural area, 14% as potential forest and corridor restoration area, 7% as the area of developments around the zoo, and 22% as predominantly rural agricultural area. A further 10% of the study area is in roads, utility corridors, landfill and other land uses. There is a strong pattern to this diversity: the river valleys and the southernmost interfluvial tablelands include the most significant natural areas, while the broader tablelands upstream also support the Zoo and, to the northwest, the utility-bisected rural landscapes of the park. These rural tablelands also support two tributary streams and a number of isolated woodlots, the linkage and continuity of which should be priorities for habitat restoration in the park.

The natural areas of the park support a rich diversity of communities and biota, including 110 native vegetation communities (dominance types), 762 plant species (531 native), 225 bird species (123 breeding species), 19 reptile and amphibian species, 55 fish species, and 27 mammal species.

The Rouge Valley Park's **regional setting in the near urban environment** of Metropolitan Toronto is of particular longterm significance. From an environmental point of view, it represents the last opportunity for conservation on this scale in Metropolitan Toronto, and a landmark social decision in favour of land use restraint in an era of extremely rapid urban development. It also represents an important opportunity for education and the interpretation of nature, our relationship with it, and the diversity of experience itself.

ii) EVALUATION OF SIGNIFICANT NATURAL AREAS

The evaluation of the park's significant natural ecosystems is based on the detailed inventory and mapping of features of the park, and on the historic and present dynamics of change in the park. The natural features, systems and processes are evaluated against criteria developed initially to select ANSIs, and which reflect current concepts of ecosystem conservation.

Representation

As discussed above, the evaluation and assessment of ANSIs in site district 7-4 (Hanna 1984), and subsequent studies by ANSI, ESA, Carolinian Canada and wetland programs, confirm the significance of the lower Rouge valley system as the **site best representing** two of the most distinctive vegetation and landform themes of the site district, specifically **Lake Ontario shoreline wetlands and river valley systems of the Iroquois Plain.**

Significant representation of other major vegetation-landform features also occurs in the study area, although not extensively, such as Lake Ontario shoreline beaches and swales, tableland forests and spring swamps on drumlinized till plain (Halton Till),and upland sand plain forests along the crests of the valley slopes.

Diversity

The concept of diversity, and its conservation, extends to all aspects of the ecosphere and its ecosystems (Rowe 1990a,b; Grumbine 1990, Probst and Crow 1991). Diversity is recognizable not only among the dominant upland and lowland forest communities, but also in the more restricted types, such as riparian thickets, marshes, seepage areas, shorelines, prairie-like clearings and valley crests. Both the dominant and minor communities contribute significantly to the diversity of species at a site and to the dynamics of the ecosystem as a whole. In fragmented landscapes, however, one of the realities of bioreserve design is the need to conserve the biodiversity of species, communities and ecosystems in less and less space under greater and greater pressures, requiring more and more detailed knowledge of what things are, where they are and what they mean (Jenkins 1988).

Within all communities and ecosystems, structural or physiognomic diversity is important to species occurrence and abundance (DeGraaf 1987). Habitat and species diversity is notably high in riparian areas. For example, aquatic ecosystems attract almost all mobile species, including fish and aquatic invertebrates, and contribute to organic soil conditions, water cooling, and wildlife corridors. Many of the Rouge's noteworthy fish, bird, plant and herp species are found in its river corridors and lakeshore marsh.

Different forest strata are important to different species, and the forest is stratified both vertically and temporally. For example, the Red-shouldered Hawk requires mature closed canopies with relatively clear understoreys, and many insectivorous birds, such as Yellow-billed Cuckoo, seek mature canopies during their singing; forests with diverse mid-storeys are needed for mid-day, bark-foraging, insectivorous birds like the Cuckoo (Anderson 1979) and the Blue-gray Gnatcatcher; open oak clearings are essential for southern plant species such as Early Sweet Blueberry (*Vaccinium pallidum*) and Poke Milkweed (*Asclepias exaltata*). There are also strata in a marsh; open grass meadow marsh for Blue-winged Teal, and dense cat-tail marsh for American Bittern and American Coot. Biodiversity is also inherent in the diversity of behaviours and the requirements of each species.

In the same way, the diversity of successional stages, and of age and size classes within forested communities creates habitat for more diverse species assemblages (James 1984a). Breeding birds show preferences for particular successional stages: for example, Ruffed Grouse, Black-billed Cuckoo and American Redstart for immature or regenerating forests; Scarlet Tanager, Yellow-throated Vireo and Ovenbird for the interior of mature forests; and Brown Snakes and Redbelly Snakes forage in old fields but migrate to the forest for hibernation.

Figure 35. The Rouge River meanders through a series of river bluffs north of Finch, with diverse bottomland terraces, upland forests, swamps and riparian communities (JLR 1991).

Figure 36. The widest portion of the Rouge valley's natural areas occurs north and south of Twyn Rivers Drive, where a 2.5 km wide valley section contains extensive bottomland, slope and tableland forests (JLR 1991).

Diversity extends through the living communities to the role they play in the organic metabolism of the ecosystem as a whole. For example, the presence of old, dying, dead and downed trees is critical for numerous birds (DeGraaf 1987), particularly hole-nesting and insectivorous species such as the Pileated and Red-headed Woodpeckers and Brown Creeper. Many plant and animal species in the park, including the Eastern Screech Owl, Wood Duck, Northern Flying Squirrel, Red-backed Salamander, Eastern Hemlock and Yellow Birch, require old, dead and downed trees and its organic debris for food, shelter and germination; their organic content builds the forest soils (Jurgensen *et al.* 1977, Otvos 1979, Tubbs *et al.* 1986, James 1984b, Runkle 1991).

Structural, successional and species diversity maintains itself naturally at a site through historic large-scale disturbances and renewals, such as windstorms, ice storms, fire and disease, but this renewal now occurs more regularly through tree-fall gaps and small-scale community replacement in the second-growth forests of southern Ontario (Woods 1979, White 1987, Runkle 1991). Even at this scale, local habitat heterogeneity affects the composition of bird communities because of changes in food resources (Blake and Hoppes 1986) and in levels of Cowbird parasitism (Robbins 1979), as well as in changes in the mosaic of other resources in the forest, such as of nitrogen (Mladenoff 1990), accessible surface water and browse for deer.

Some aspects of structural diversity are expressed as the 'edge effect', which occurs where natural boundaries between communities exist, although 'edge' is most often used to describe the line between forest and agricultural field, which is among the least natural of community boundaries. All edges are variably recognizable to different species. Deer prefer forest exterior edges for browse, where regenerating woody species dominate, although forest cover is necessary for shelter. Deer have become one of the primary determinants of forest composition and structure throughout the Great Lakes region (Frelich and Lorimer 1985), and their management at appropriate population levels in the Rouge Valley Park will provide difficult challenges.

Inside the forest, another edge occurs, where the effects of increased wind, sun, detritus, seed rain, nest predation and herbivory reduce songbird diversity, increase the frequency of introduced plants, and encourage generalist bird species (Saunders *et al.* 1991). These negative effects have also been documented around canopy gaps and along trails in forest interiors (Wilcove 1988, Hickman 1990). In the lower Rouge, historic landscape changes (Chapter II.i; Map 1) have resulted in a structurally diverse ecosystem, with large acreages in all successional forest stages from field to 150 year-old hardwood, mixed and conifer forest, and in natural non-forested communities as well.

Native plants and animals have had the highest profile in the conservation of biodiversity. Current rates of species extirpation, both locally and worldwide, validate this concern. The documentation of rare or threatened species is of particular importance because such species convey special conservation imperatives (Mosquin and Suchal 1977, Sandborn 1990, McNeely *et al.* 1990). Maintenance of species diversity in the fragmented natural ecosystems of southern Ontario is particularly challenging because fragmentation directly and indirectly reduces population numbers (Wilcove 1987). As a result, a large proportion of native species of southcentral Ontario are locally (and provincially) rare (Riley 1989, Oldham 1990, Riley *et al.* 1991, Campbell *et al.* 1990). In the Rouge Valley Park, 22% of the native flora and 32% of the breeding birds are considered rare, most of them because of the significantly reduced extent of natural habitat in the surrounding region.

The diversity of individual species in an ecosystem is often used as an index to site diversity and genetic diversity. Species diversity is also a measure of the level of detail of our knowledge of particular ecosystems. In the study area, thorough documentation has been attempted of all species of select groups, with a focus on those which are rare in the context of their national, provincial, regional and local occurrence. These base-line data can assist future efforts at conserving and interpreting biodiversity in the park.

Diversity is particularly important in ecosystems which are the product of gradual, incremental change over time, and are not subject to large-scale catastrophic rejuvenation, such as Ontario's southern forest ecosystems. At this scale, the size, shape and spatial arrangement of natural areas is referred to as landscape diversity. Landscape diversity confers stability on ecosystems, as well as resistance to disturbance and greater regeneration opportunities; it is widely threatened by human activities; the conservation of biodiversity has become an accepted tenet

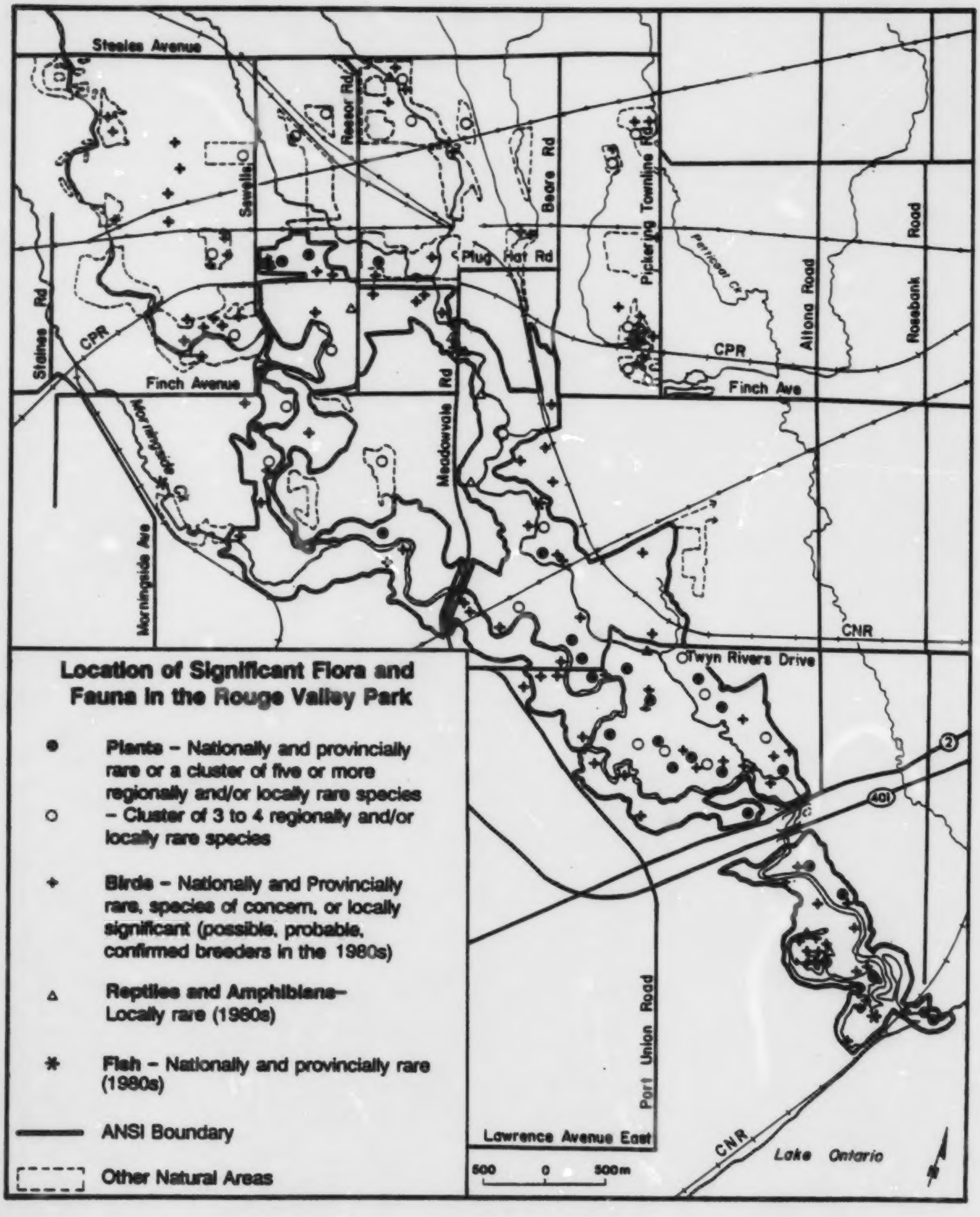

Steeles Avenue
Reesor Rd
Sewells
Beare Rd
Pickering Townline Rd
Plug Hat Rd
Petticoat Ck
Altona Road
Rosebank Road
Staines Rd
CPR
Finch Avenue
CPR
Finch Ave
Morningside Ck
Meadowvale Rd
Morningside Ave
CNR
Twyn Rivers Drive
2
401
Port Union Road
Lawrence Avenue East
CNR
Lake Ontario
500 0 500m
Location of Significant Flora and Fauna in the Rouge Valley Park
● Plants – Nationally and provincially rare or a cluster of five or more regionally and/or locally rare species
○ – Cluster of 3 to 4 regionally and/or locally rare species
✦ Birds – Nationally and Provincially rare, species of concern, or locally significant (possible, probable, confirmed breeders in the 1980s)
△ Reptiles and Amphibians– Locally rare (1980s)
✱ Fish – Nationally and provincially rare (1980s)
ANSI Boundary
Other Natural Areas

Figure 37. Location of significant flora and fauna in the Rouge Valley Park. (Data on northeast quadrant from Kamstra 1991.)

of environmental education, scientific research and land planning, and is an expression of human dependency on biota and landscapes for food, medicine, shelter and other products (Pojar 1990).

The inventory of the Rouge Valley Park has documented an impressive diversity of landforms, communities, species and ecological processes in the park. For example, the park supports 110 native vegetation community types, 531 native plant species (28% of Ontario's native flora), 225 bird species (30% of Ontario's avifauna), 27 mammals, 19 reptiles and amphibians, and 55 fish species.

Ecological Functions

A corollary of the principle of diversity is that the size, shape and connectedness of natural ecosystems are important to the achievement of diversity. Studies of island biogeography suggest that species and community extinctions are less likely to occur in larger, linked sites or closely spaced sites than in small, isolated sites (MacArthur and Wilson 1967, Diamond 1975). Species emigration and extirpation was found to exceed immigration on small islands (and "islands of green"); population stability and species immigration is more probable on large sites; the dynamics of the 'immigration' of migratory birds are played out on an annual basis. Since initial studies of island biogeography, this important conservation theme has focussed on the effects of ecosystem fragmentation.

Ecosystem fragmentation has numerous biological consequences which must be considered in planning natural areas. Fragmentation generally results in a landscape that consists of remnant areas of native vegetation surrounded by agricultural and other developed land. As a consequence, fluxes of radiation, wind, water, detritus, seed rain and nutrients across the landscape are altered significantly, inside and outside remnant natural areas. These can have important effects on the success and survival of biota within remnant areas. There is evidence of the negative effects of fragmentation on birds, mammals, other animals, and plants (Harris 1984, Wilcove 1988). The effects vary with the history of isolation, the distance from other remnants, and the degree of connectivity with other remnants. Changes in the ecosystem, mostly driven by external factors, vary with the size, shape and position of natural areas in the landscape, the larger and more connected remnants being less adversely affected (Saunders *et al.* 1991, Noss 1987, Wilcove 1987).

The identification and the management of significant natural areas must consider the degree of landscape fragmentation, its biological consequences, and the internal and external land uses that affect them. For relatively small remnants and remnants isolated by considerable distances, such as the Rouge Valley Park, management should be directed primarily at understanding and controlling the impacts of external influences (Janzen 1986), which include, in this case, access, buffering, the loss of landscape linkages within the park and beyond the park, water quality and quantity, and invasive alien species.

Size, shape, connectedness are, as a result, important conservation considerations, although they are seldom quantifiable except by species-area equations which usually lack any regional context. Qualitative considerations include: i) single large sites are superior to numerous small sites of the same area; ii) compact sites with low edge:area ratio are superior to elongate sites with high ratios; iii) several sites close together are superior to the same sites further apart; iv) sites connected by corridors are superior to unconnected sites; and v) 'core' and protected natural areas play important 'reserve' and 'founder' roles for nearby sites and for other local, but isolated sites; and vi) protected natural areas must be elements of 'systems' of natural areas, with replication as a deliberate goal (Wilson and Willis 1975, Robbins 1979, Francis 1980, Noss 1987, Robbins *et al.* 1989a, Wilcove 1988).

In the case of ANSIs in southern Ontario, comparisons are also made to other natural areas in the region, considering how much natural vegetation still remains in the region. The recommended ANSI boundary in the study area encompasses a large area (810 ha, Fig. 37), with as compact a shape as possible in the valley context, organized around two major river valley corridors, and connected laterally between valleys across slopes and tablelands. Other less connected, smaller natural area remnants are mapped, and deliberately proposed as core natural areas to be linked by restoring the habitats between them. These natural corridors are oriented largely to the major river valleys and to the minor tributaries of Little Rouge Creek.

Natural area boundaries corresponding to **watershed units** are considered more desirable because of the natural continuity of such features and the greater potential to influence water-based effects. The Rouge and Little Rouge are the dominant features of the ANSI, and although headwater conservation is possible only on three minor tributary streams, these were evaluated as important in mapping significant areas and potential restoration areas.

All water-based ecosystems and processes are important considerations in natural area selection and planning. The wetlands associated with the valleylands of the Rouge perform numerous biological and hydrological roles, especially the lakeshore marshes, which reflect and integrate the inputs of the upstream watershed, Lake Ontario and the adjacent urban areas. The smaller wetlands along minor stream corridors and in abandoned river meanders, and the seasonal pools in tableland forests and seepage areas on slopes, maintain accessible surface water critical to mobile biota, and support diverse specialist species and communities. For example, 9 Wood Ducks, 13 Mallards, 2 American Ducks and one Mallard X Black Duck hybrid were found using a single seasonal pool in the spring of 1990.

Other related considerations include **area-dependent species and processes.** With respect to breeding birds, larger forest tracts support both the generalist species of the exterior and interior 'edges', and the rarer area-dependent species of the forest interior. In the Rouge, for example, Red-shouldered Hawk no longer occur, but Black-and-white Warbler, Pileated Woodpecker, Blue-gray Gnatcatcher, Red-eyed Vireo, Scarlet Tanager, Ovenbird and Veery do, among numerous area-sensitive species (Fig. 25, Map 3), more or less centred on the large forests on the tablelands, slopes and bottomlands of the central valley. Such species may also be 'edge-sensitive', and various factors (parasitism, competition, predation, microclimate) may reduce their reproductive success near the edges of forests. (It has been noted that area-dependent species may also take up residence in smaller forest tracts if they contain stream and riparian communities, as is the case with many of the smaller woodlots of the Rouge (Robbins *et al.* 1989a).)

Documentation is now accumulating on the breeding probabilities of forest-interior birds, especially neotropical migrants, in remnant, northeastern temperate forests (Robbins 1979, Whitcomb *et al.* 1981, Ambuel and Temple 1983, Blake and Karr 1987, Robbins *et al.* 1989a, Blake 1991). For example, from one study, in forest remnants of more than 100 ha, Scarlet Tanager and Ovenbird may have more than a 70% probability of being detected as breeding, while the same species would have less than a 15% chance of being detected as breeding in a similar woodlot 1 ha in size (Robbins *et al.* 1989a). This preference for the largest forest tracts is certainly the case for these two species in the park (Fig. 25).

There may be few species of neotropical migrants for which forest remnants less than 10 ha in northeastern North America provide adequate habitat for breeding at any levels, and much larger areas are required to support sufficiently dense populations for them to be reproductively viable (Gibbs and Faaborg 1990, Bolger *et al.* 1991). Minimum area requirements for viable populations are difficult to quantify because local faunal populations are often part of regional 'metapopulations' (Freemark 1988). Similarly, the minimum levels of species abundance needed to maintain viable local populations is also difficult to quantify, but may be in the order to 500-1000 interactive individuals for many animal species (Soule and Wilcox 1980). (There is considerable current debate as to whether neotropical migrants as a whole are declining, partly as a result of the fragmentation of temperate forests (Robbins *et al.* 1989b), or are simply undergoing cyclic fluctuations in numbers (Hussell, pers. comm.))

Freemark (1988), working in the Ottawa area, summarizes her Ontario results by noting that the **number of breeding bird species increases with area** and, to maintain a diverse avifauna, both **forest size and habitat heterogeneity** among forests should be maximized. The results of the breeding bird inventory in the Rouge have been reviewed in this context, as well as in terms of the diverse non-forest habitats of the site. This has implications, in particular, for the more isolated woodlots, and for potential restoration of forest corridors and edges.

Home-range sizes have ben calculated for many mammals (Harris 1984). Their size requirements also vary with the specific types and diversity of habitat required in those home-ranges. For example, the diameter of home-ranges for Skunk, Beaver, Long-tailed Weasel and Red Fox may be in the order of 1 km, and the home-ranges of Mink and Coyote in the order of 2 km diameter. The Rouge Valley Park is large enough to support these species at the present time, but they may be reduced over time, as their linkages to regional metapopulations are severed.

Other species are less area-dependent, and very small forested or non-forested communities can sustain long-lived trees and shrubs, and rare plant species and communities if protected and properly managed (Reznicek 1987, Bricker and Reader 1990). However, maintaining stable species compositions in small sites may require ongoing management because of the seed rain and migration of external and edge species into small sites (Ranney *et al.* 1981). Detailed botanical inventories highlight such sites and, in the Rouge, all significant native plant species and communities are recommended for deliberate conservation.

Corridors linking natural habitats allow and direct species migration, the movement of species requiring habitat diversity, and the necessary reproductive interchange within and between populations. Valleyland corridors also act as reservoirs of species diversity and refuges for species during years of range contraction, such as is the case with reptiles and amphibians especially. As a result, connected, linked, natural areas have enhanced significance and long-term viability, although empirical evidence of these effects is only now accumulating (Adams and Dove 1989). Certainly, the original landscape was interconnected, and habitat and species corridors occur in all landscapes, along valleys, steep slopes, ridge tops, wetlands and watercourses.

Corridors also play important functional roles in the landscape. Stream and riparian corridors, for example, provide benefits such as the preservation of water quality by acting as sediment and nutrient filters, minimization of runoff impacts, control of erosion, control of temperature, food sources, maintenance of fish and wildlife habitat, and other aesthetic and recreational values (O.M.N.R. Central Region 1987). The lower Rouge is a major river corridor itself and, within it, numerous other corridors exist, such as along slope crests, tributary streams and along forested fencerows.

Corridors occur within the park itself, but existing and potential corridors outside the park, linking its biota with the region in general, are also very important in the long term, as urbanization continues. The most significant natural corridors linking the park regionally to the Oak Ridges Moraine and Durham Regional Municipality, are the corridors north along the Rouge and Little Rouge, and eastward along the hydro corridor and numerous large woodlots to Altona Forest and the Duffins Creek.

Even utility corridors or walking trails may provide some degree of connection in urban landscapes, but the emphasis here is on corridors linking natural areas. In the Rouge numerous linked and unlinked natural areas occur in close proximity, with the linkages generally becoming more remote and lacking towards the north in the park. Two major watercourses, numerous tributary streams and spring drainways, and now-isolated woodlots provide a skeleton of natural features in the northern part of the park, which can be linked by restoring forested conditions in planned corridors (Map 5).

The potential for linking habitats which are now fragmented is of importance to a park because such links would enhance the viability of now-isolated woodlots, restore stream and river corridors, and infill disturbed areas within otherwise continuous forested tracts. Many of the potential corridors are already in abandoned agricultural fields, some with advanced woody regeneration of appropriate, native, successional species. (The past processes of succession and the future of habitat restoration are important in the context of the Rouge Valley Park, and are dealt with more fully in Chapter III.ii and III.iv.)

Some corridors may also transmit disease or invasive aliens, but these effects may be inevitable even in unlinked natural areas because of airborne transmission (e.g. Dog-strangling Vine, Gypsy Moth in the Rouge).

Old-growth forests, from 130 to 155 years old, dominate the park's forests. These forests regenerated from some of the earliest forestry in the region, done largely by non-mechanized means, to supply local mills, export needs, farm use, potash, and ship construction. In many cases, these forests appear to have not been substantively altered since that era. Within the regional context, these are mature old-growth forests.

In presettlement times, extensive areas of old-growth forest were common in eastern North America (Bormann and Likens 1979); estimates of the coverage of the eastern deciduous forest region by mature and old-growth forests are around 80%, with 'gaps' of regenerating or otherwise open lands at 20% (Lorimer 1989). Few uncut stands of any size have survived, especially in southern Ontario. Introduced pathogens like chestnut blight and Dutch elm disease have also modified the subsequent forests significantly. As a result, in this region, old growth is not defined as 'untouched' forest, but on the basis of the dominant tree species, their age, size and reproductive biology, and the forest structure, with less rigid restrictions regarding human activities (Leopold *et al.* 1989, Parker 1989). In the broadest sense, they are forests which are 'relatively old and relatively undisturbed by humans' (Hunter 1989).

In the study area, examples of forests 130 to 150 years old include: the Red Oak-White Oak-White Pine forest at U.T.M. 505513; the White Pine stand at U.T.M. 453522; the Sugar Maple 'Core Woods' on the Metro Zoo U.T.M. 460534); and many of the Rouge's other Sugar Maple, Red Oak, Beech, Black Maple, White Cedar and Hemlock stands. Non-forested communities, such as the marsh ecosystems and streamside meadows of the park, may also deserve attention as communities with special attributes because of their maturity.

Old-growth forests are generally considered to support a diversity of ecosystem processes less well developed in immature forests. Some of these processes are associated with area-dependent species and greater levels of standing and decaying biomass (Runkle 1991), but they also extend to soil conditions, microclimatic effects and nutrient levels (Jurgensen *et al.* 1977). Today's mature forests are not replicas of the presettlement forest, and they may require management if particular dominance types or 'era management' is desired (Barnes 1989).

Condition

The present condition of a natural area is important both to its evaluation and to its long-term management. Natural disturbances are critical aspects of ecosystem change and rejuvenation. Many of the changes in ecosystems can be seen as disturbance-driven, for example, floods, erosion and accretion, weather events, water-level changes, gap dynamics in forests, and pathogens (White 1987).

However, the 'condition' of a site reflects the disturbances which are primarily the result of human activities. From this perspective, the effects of logging, grazing, drainage, flooding, channelization, stream armouring, bottow pits, dams, roads, multi-use trails, landfill, infill, transportation and utility routes, and the effects of some forms of recreation are usually negative aspects of a site. In many urban areas, disturbed sites such as utility routes can provide the only unoccupied habitats available to wildlife. Few if any sites in southern Ontario are pristine, but many are more so than others.

In the portion of the study area recommended as an Area of Natural and Scientific Interest, it appear that grazing has not occurred in the valleys or the intervening tablelands for a very long period, based on the lack of evidence of erosion around the main lateral roots of large trees, and the condition of the ground flora. The spring ground flora is generally of exceptional quality in the Rouge, with extensive areas of *Trillium* and other spring vernals which are sensitive to grazing by cattle. As mentioned above, signs of recent logging are rare and many of the forests appear largely uncut in the last 130 to 150 years. (Thirty-eight ha of forests were cleared from the 1930s to 1950s and, more recently, selective cutting occurred on the Hog's Back south of Twyn Rivers Drive in the 1960s, and in a Beech - Sugar Maple forested slope in the Beare Road woodlot in the 1980s.)

Transportation and utility routes cross the park in numerous locations, and their frequency in the northern part of the park was one of the factors in not recommending parts of that area as nature reserve zones continuous with

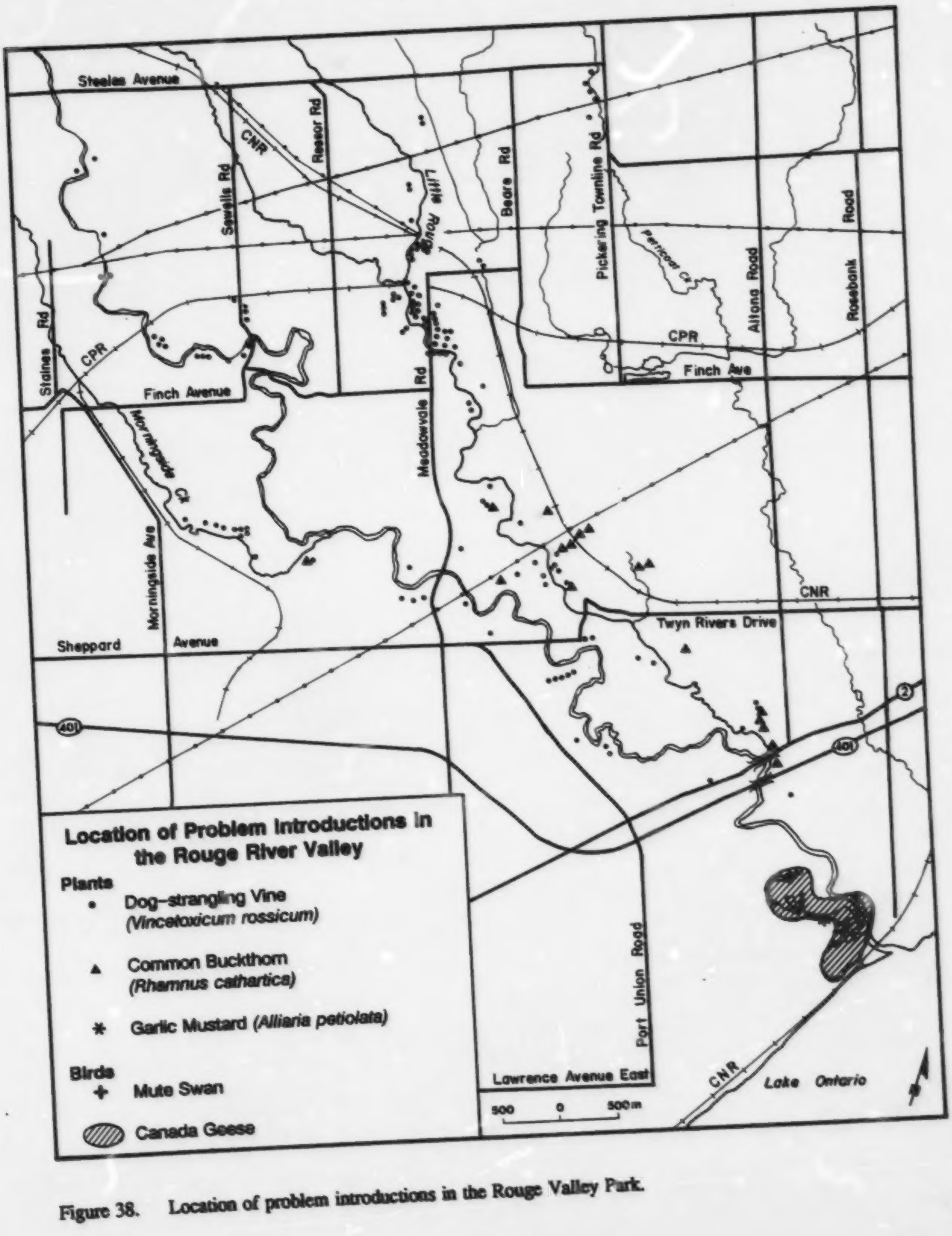

Location of Problem Introductions in the Rouge River Valley
Plants
● Dog-strangling Vine (Vincetoxicum rossicum)
▲ Common Buckthorn (Rhamnus cathartica)
* Garlic Mustard (Alliaria petiolata)
Birds
+ Mute Swan
▨ Canada Geese
Steeles Avenue
CNR
Reesor Rd
Sewells Rd
Little Rouge
Beare Rd
Pickering Townline Rd
Petticoat Ck
Altona Road
Rosebank Road
Staines Rd
CPR
Finch Avenue
Finch Ave
Morningside Ck
Meadowvale Rd
Morningside Ave
Sheppard Avenue
Twyn Rivers Drive
401
2
Port Union Road
Lawrence Avenue East
Lake Ontario
500 0 500m

Figure 38. Location of problem introductions in the Rouge Valley Park.

the recommended nature reserve zone south of the Canadian Pacific rail line. In the recommended nature reserve zone from Lake Ontario to just north of the C.P.R., the site is broken by two major transportation routes (Highways 401 and 2; and Meadowvale Avenue), one major hydro corridor, and five minor transportation corridors (Canadian National rail at the lake, Twyn Rivers Drive, Finch Avenue, Reesor Road, Beare Road landfill access road).

These transportation and utility routes are less frequent here than most areas of comparable size in the vicinity of Metropolitan Toronto, but detract from the continuity of natural landscapes in the park. Habitat restoration as close as possible to road surfaces, and under hydro routes, would mitigate this condition somewhat (Chapter III.iv).

The conditions of the park, and their history, are outlined in Chapter II.i. Channelization, landfill, infill, borrow pits, aggregate operations, trail proliferation, dams, diversions, stormwater engineering, and stream armouring at bridge abutments and culverts (Beare Road landfill access road) have all had impacts on the Rouge.

However, overall, many of these impacts have been 'healed' by rapid forest regeneration, free-flowing rivers, and low-impact land uses over the last 35 years of mostly public ownership. This natural restoration has particularly benefitted the valleys south of the cross-valley C.P.R. line, and the general condition of this area is an important consideration in recommending that area as an ANSI.

Throughout the park, aggressive, weedy plant species such as Dog-strangling Vine and Common Buckthorn, and others that will appear in the future, will present problems in areas where natural area management is the priority (Fig. 38). The high density of raccoons at the Metro Zoo, for example, has a profound effect, at present densities, on wildlife in the park, particularly on ground nesting birds, amphibians and reptiles (Johnson, pers. comm.). Similar challenges, by species degrading the condition of natural areas, will be posed by forest pathogens, feral animals and other unwanted biota in the future.

Special Features

Within the local, regional, provincial and national context, documentation is accumulating that numerous species, communities and other features of natural areas are of special conservation significance. For example, the Rouge Valley Park provides habitat for numerous rare species (Maps 3,4; Tables 4,6,9); 6 nationally or provincially rare plants; 92 regionally rare plants; five nationally or provincially rare breeding birds; four other breeding birds of special concern; numerous locally rare, area-sensitive, raptor and colonial birds; 2 nationally vulnerable fish species; 6 locally rare reptiles and amphibians; and numerous locally significant mammal species. Other species are of interest because they occur at the Rouge at their geographic range limits; Sycamore and Early Sweet Blueberry are examples of such plant species, and Stoneroller, Blue-gray Gnatcatcher and Orchard Oriole are examples of vertebrates.

Nesting sites for colonial birds, such as the Black-crowned Night-Heron or the formerly nesting Black Tern, are increasingly of concern in southern Ontario, as are wetlands where concentrations of breeding and migrating waterfowl occur. The occurrence of Beaver, Vesper Sparrow, and White-tailed Deer is notable in the context of Metropolitan Toronto, as are the populations of many species whose ranges have been nearly eliminated in the urban and farm areas of the Greater Toronto Area.

Communities of special significance in the park include all those of the lower marshes, including open water aquatics, cattail marsh, sedge marsh, Canada Bluejoint meadow marsh, and thicket swamp (CT 2,3,4a,5a,6). Others include: the Water Arum meadow marsh (CT 5h); the White Pine - Hemlock slope forests (CT 18b); the dry Red Oak - White Oak forests (CT 15a,b,21); the forests with Black Maple as a co-dominant or dominant species (CT 12e,13c,17a,23a); the Great Lakes shoreline communities (CT 28a-d); and the Big Bluestem prairie-like forest clearings (CT 30c). All of these communities are rare or uncommon in site district 7-4.

iii) SUMMARY OF LIFE SCIENCE FEATURES OF THE PARK

In order to summarize the life science features in a convenient format, the Rouge Valley Park has been subdivided into twelve theme areas (Fig. 39) on the basis of major physical breaks, physiographic changes and watersheds in the park. Theme areas 1 to 5 encompass the Rouge Valley Area of Natural and Scientific Interest. The rest of the Rouge watershed is subdivided into: theme areas 6 and 7, the two river valleys of the Rouge and Little Rouge, north of the recommended ANSI; theme area 8, the Metropolitan Toronto Zoo lands; theme area 9, the uplands between the Rouge River and the Little Rouge Creek valleys; and theme area 10, the uplands east of the Little Rouge and draining into it. Theme area 10, and theme area 11 which encompasses the Petticoat Creek watershed, were addressed in a complementary study (Kamstra 1991), and are summarized here. Theme area 12 is the Beare Road landfill site.

THEME AREA 1

The lower Rouge valley from Lake Ontario to Highways 401 and 2 supports an exceptional diversity of vegetation communities, including a variety of marshes, thicket swamps, bottomland deciduous forests, oak terraces, and valley slope forests predominantly of Red Oak, Red Oak and White Oak, and Hemlock.

The largest and most pristine lakefront marsh in Metropolitan Toronto occurs in this area. The Rouge lakefront marsh (CT 1,2,3,4 and 5a) is a provincially significant and regionally rare wetland. There are only four lakefront marshes in Metro Toronto (Grenadier Pond, Highland Creek Marsh, Humber Marshes and the Rouge), and only an additional four lakefront marshes in all of site district 7-4 (Duffin Creek Marsh and Shoal Point Marsh in Durham, and Credit River Marshes and Rattray Marsh in Peel).

Lakefront marshes on the north shore of Lake Ontario have experienced dramatic declines over the years. It is estimated that Metro Toronto has lost 92% of its lakefront marsh acreage (Varga 1980, Whillans 1982). These include the 400 ha Ashbridges Bay Marsh at the mouth of the Don River, the loss of most wetlands on the Toronto Islands, and the infilling of parts of Grenadier Pond, the Humber Marshes and the Highland Creek Marsh. Along the lakeshore from Hamilton to Oshawa, McCullough (1982) reported an 83% loss of lakeshore marshes.

The Water Arum (*Calla palustris*) meadow marsh and Speckled Alder (*Alnus rugosa*) thicket swamp (CT 5h and 6b), just upstream of the lakefront marsh, form an unusual wetland in site district 7-4, noteworthy for supporting several northern species, including Swamp Rose (*Rosa palustris*) and Bog Willow (*Salix pedicellaris*).

The 300 m of natural shoreline on the east side of the Rouge River mouth sustains the park's only shoreline wet meadow and beach strand communities (CT 28), with an assemblage of species restricted to Great Lakes shores (Fig. 40). Natural dynamic shorelines, once common in site district 7-4, have become rare as shores were infilled, stabilized by breakwalls, converted to bathing beaches, or lost to urban, port and other uses. There are remnants remaining on Burlington Beach in Halton, the Toronto Islands and the Rouge in Metro Toronto, and the rivermouth bars at Shoal Point and Duffins Creek in Durham, and Rattray Marsh in Peel. Some Great Lakes shore communities have also started to develop on lakeshore landfill sites (the Leslie Street Spit, and several landfill parks in Peel).

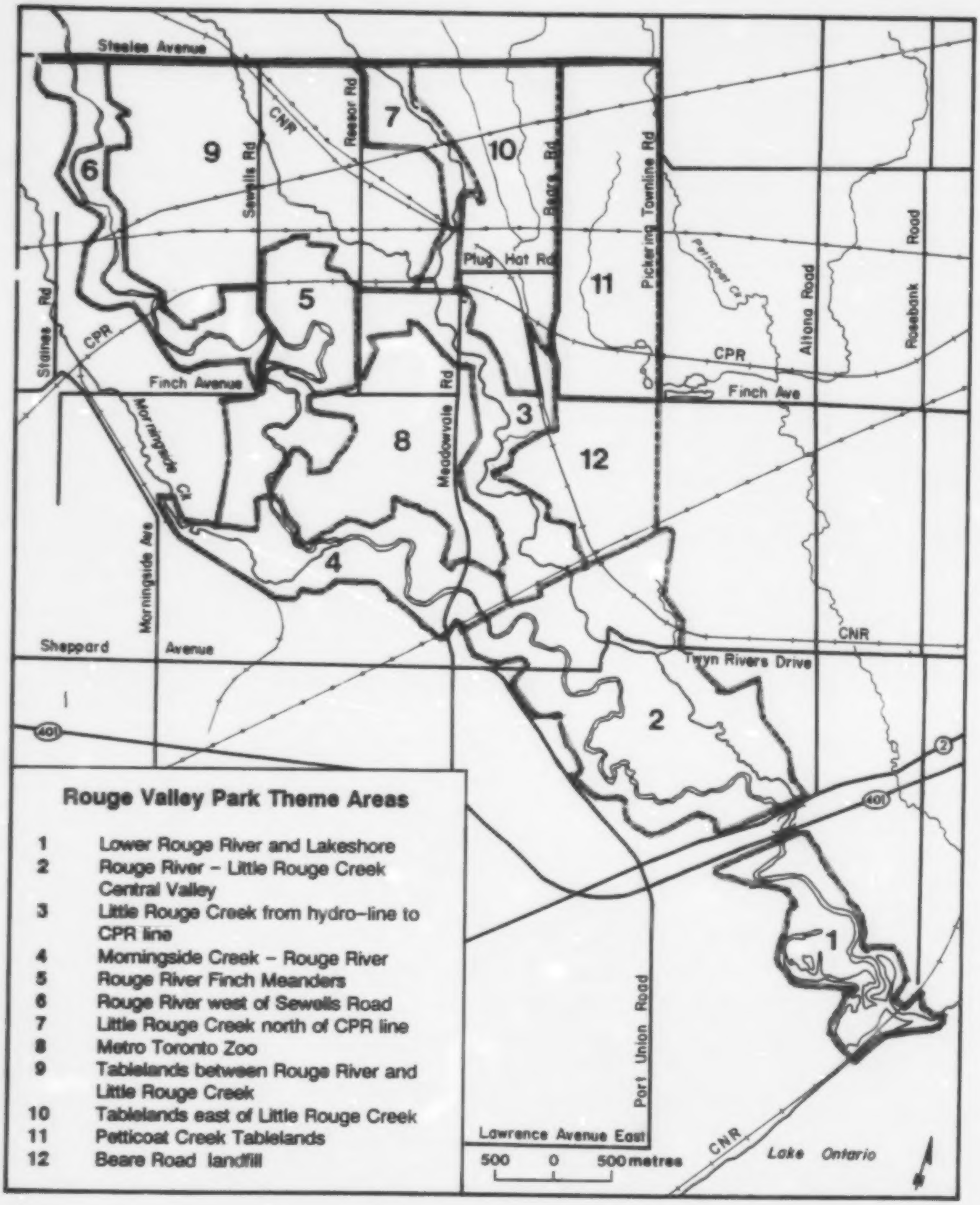

Rouge Valley Park Theme Areas
1 Lower Rouge River and Lakeshore
2 Rouge River – Little Rouge Creek Central Valley
3 Little Rouge Creek from hydro-line to CPR line
4 Morningside Creek – Rouge River
5 Rouge River Finch Meanders
6 Rouge River west of Sewells Road
7 Little Rouge Creek north of CPR line
8 Metro Toronto Zoo
9 Tablelands between Rouge River and Little Rouge Creek
10 Tablelands east of Little Rouge Creek
11 Petticoat Creek Tablelands
12 Beare Road landfill
Steeles Avenue
CNR
Reesor Rd
Sewells Rd
Beare Rd
Pickering Townline Rd
Petticoat Ck
Altona Road
Rosebank Road
Plug Hat Rd
Staines Rd
CPR
Finch Avenue
Finch Ave
Morningside Ck
Meadowvale Rd
Morningside Ave
Sheppard Avenue
Twyn Rivers Drive
401
2
Port Union Road
Lawrence Avenue East
Lake Ontario
500 0 500 metres
1
2
3
4
5
6
7
8
9
10
11
12

Figure 39. Rouge Valley Park theme areas.

Table 11. Significant flora and fauna of the Rouge Valley Park theme areas

	Theme Areas											
	1	2	3	4	5	6	7	8	9	10^1	11^1	12
Plants												
Nationally and Provincially Rare	2(1)	4(1)		1					1			
Provincially Rare	1(1)											
Regionally Rare	32(22)	51(30)	11(2)	9(1)	20(3)	9	5(1)	2	7	1	7(3)	
Rare in Site District 7-4	18(13)	16(11)	5(1)	2(1)	3	3	3(1)				2(2)	
Rare in Metropolitan Toronto and York R.M.	14(9)	35(19)	6(1)	7	17(3)	6	2	2	7	1	5(1)	
Locally Rare	5(3)	13(10)	1	2	8(2)	1	2	1	2	1	2	
Birds												
Nationally and Provincially Rare or Threatened	2(2)		1		1						1	
Species of Concern	1(1)				1(1)							
Locally Significant	9(3)	14(2)	6	5	7	7(2)	4(1)		6(1)	2	11(5)	1(1)
Fish												
Nationally and Provincially Vulnerable	1	1	1	2								
Reptiles & Amphibians												
Rare in Metro Toronto	1	1	3(1)		1(1)	1	1					
Mammals												
Rare or Uncommon in Metro Toronto	3(2)	3(1)	2	7(3)*	1	1	1	1	1			

Legend:

Bird totals are based on those that are confirmed, probable and possible breeders in the Rouge Valley Park

(X) Number of species which are unique to a particular theme area

* Reflects uneven sampling in mammal data base

[1] Based on Kamstra 1991.

The rest of the bottomlands here are a large expanse of Manitoba Maple and Crack Willow forests (CT 12a,b), one of the largest such examples in the park (Fig. 41). The surrounding valley slopes harbour half of the park's drier Red Oak and White Oak forests (CT 15), noteworthy for its large concentration of rare dry ground flora. This forest type can be considered uncommon in site district 7-4. Dry oak valley slope forests are also known from Bronte Creek Provincial Park, and the Credit River.

This theme area supports a large number of rare plant species, including the nationally and/or provincially rare Shy Bulrush (*Scirpus verecundus* - the largest colony in the park), Small Beggar-ticks (*Bidens discoidea* - the only population in the park), and Bushy Cinquefoil (*Potentilla paradoxa* - the only population in the park), 32 regionally rare species, and 5 locally rare ones. The rare flora is concentrated on the natural Lake Ontario shores, the lakefront marsh, the Water Arum marsh and thicket swamp just upstream, and the valley slope oak forests. Most of this rare flora does not occur elsewhere in the park.

Seventy-six species of birds were recorded in this area during their breeding season, of which 69 were confirmed, probable or possible breeders. This area supports the highest concentrations of threatened, rare, colonial and otherwise significant breeding bird species within the park.

Black Tern, American Bittern, Least Bittern, Black-crowned Night Heron, Wood Duck, Blue-gray Gnatcatcher, Virginia Rail, American Coot, Eastern Screech Owl, Pileated Woodpecker, Cliff Swallow, Brown Creeper, Marsh Wren and Winter Wren are presently or have historically bred in this area. The area is also host to a number of significant breeding season visitors including Common Loon, Great Blue Heron, American Black Duck, Great Black-backed Gull, Caspian Tern, Common Tern, Double-crested Cormorant, Carolina Wren and Northern Waterthrush.

Additionally, the lakefront marsh is visited during migration by Great Egrets, which may have bred there a century ago (Baillie and Harrington, 1936), considerable numbers of waterfowl, including several regionally rare species, shorebirds, and, in winter, the woods and gardens of the perimeter have been frequented by Red-bellied Woodpecker and Carolina Wren. The bulk of the park's exceptional historical bird sightings are from this area, because of its habitat diversity and its role along Lake Ontario as a concentration point for migrants (and birders). Historical rare bird records include Brant, White-fronted Goose, Yellow-crowned Night-heron, Purple Gallinule, Willet, Hudsonian Godwit, Franklin's Gull, Snowy Owl and Northern Raven.

The lakefront marsh also supports such rare fauna as the Map Turtle, Northern Water Snake (last seen in 1973), Beaver, Mink, and Stoneroller.

THEME AREA 2

This theme area encompasses the Rouge River valley, the Little Rouge Creek valley, a narrow intervening tableland or 'hog's back', and adjacent uplands. It stretches from Highways 401 and 2 to a major hydroline cutting across the valleys. The only road through the area is the narrow Tywn Rivers Drive.

Nowhere else in Metro Toronto or in site district 7-4 can one find two similarly large forested valleys separated by a narrow forested interfluvial tableland (Fig. 42). Forests stretch up to 2 km across the two valleys, and for 3 km upstream. These forests are especially diverse because of the variety of slope aspects, the varied soil moisture conditions, and the intact tablelands.

Within the park, theme area 2 contains the largest and best quality examples of such forest types as: moist valley slopes of Hemlock and White Cedar (CT 19) on cool sites; drier Red Oak - Sugar Maple and Red Oak - White Oak valley slopes and tablelands (CT 15, 16, 21, 22) on warmer sites; Hemlock - oak tablelands (CT 24a),; and bottomland terraces of Manitoba Maple, Crack Willow and Balsam Poplar (CT 12). The drier tableland forests are largely or entirely confined in the park to this area.

Figure 40. Lake Ontario bluffs immediately east of the Rouge River mouth, with old fields on the rim and a narrow section of natural shoreline beach and swales along the water (JLR 1991).

Figure 41. East side of Rouge River south of Hwy. 401; with willow bottomlands, oak slopes and the chimney of an abandoned cottage used before Hurricane Hazel devastated the lower valley (JLR 1991).

There are also good quality smaller examples of such mesic deciduous forest types as Beech - Sugar Maple (CT 17c) and Sugar Maple (CT 17b,f) valley slopes. In addition, a number of forest types uncommon in the park are best displayed here, including: Red Oak - White Cedar valley slopes (CT 18d), White Cedar - Hemlock bottomland terraces (CT 13b), and White Cedar - Manitoba Maple bottomlands (CT 13a). This area also sustains the park's only examples of Mountain Maple (*Acer spicatum*) thickets (CT 9), and prairie-like Big Bluestem (*Andropogon gerardii*) openings (CT 31c).

Swamps occur on the uplands to the east of the Little Rouge Creek valley. Here White Ash - Green Ash swamps, mixed White Cedar swamps and successional swamps (CT 7, 8) drain into a high quality tributary ravine, one of only two such small tributary ravines in the park (Fig. 43). Swamps elsewhere in the area include a small example of mixed swamp on a valley terrace (CT 8), and some of the park's best examples of mixed White Cedar seepage slopes (CT 10) on the west side of the Rouge River.

This central valley complex supports the park's largest concentration of plant rarities, including the nationally and provincially rare American Ginseng (*Panax quinquefolius*), a rare hawthorn (*Crataegus corusca*), Sharp-leaved Goldenrod (*Solidago arguta*), and Shy Bulrush (*Scirpus verecundus*), as well as 51 regionally rare species and 13 locally rare ones. Most of these species are restricted in the park to this theme area.

The rarities are largely found on the drier oak slopes and valley crests, and the prairie-like Big Bluestem openings, including such species as: Canada Milk-vetch (*Astragalus canadensis*), Early Sweet Blueberry (*Vaccinium pallidum*), Hairy Agrimony (*Agrimonia pubescens*), a sedge (*Carex foenea*), panic grasses (*Panicum columbianum*, P. xanthophysum), Slender Wheat Grass (*Agropyron trachycaulum*), and Seneca Snakeroot (*Polygala seneca*). Plant rarities are also found on the Hemlock and White Cedar slopes (Hobblebush (*Viburnum alnifolium*), the clubmosses (*Lycopodium dendroideum*, *L. digitatum*), and Stickseed (*Hackelia deflexa*)); in the deciduous and mixed bottomland forests, a clearweed (*Pilea fontana*), Moonseed (*Menispermum canadense*), Angelica (*Angelica atropurpurea*), White Grass (*Leersia virginica*), and Riverbank Wild Rye (*Elymus riparius*)); and the mesic Sugar Maple valley slopes a mountain-rice (*Oryzopsis racemosa*), and Canada Brome (*Bromus pubescens*)).

Sixty-seven bird species were recorded in this area during the 1990 survey as confirmed, probable or possible breeders. Locally significant species include Great Blue Heron, Black-crowned Night-heron, Blue-gray Gnatcatcher, Ruffed Grouse, Black-billed Cuckoo, Eastern Screech-owl, Whip-poor-will, Ruby-throated Hummingbird, Pileated Woodpecker, Eastern Phoebe, Least Flycatcher, Winter Wren, Yellow-throated Vireo, Pine Warbler, Magnolia Warbler, Canada Warbler, Mourning Warbler and White-throated Sparrow. The presence of White-throated Sparrow and Winter Wren as breeders in the White Cedar and Eastern Hemlock forests, respectively, give portions of the valley slopes a distinctly northern flavour. This contrasts remarkably with the Carolinian Blue-gray Gnatcatchers of the adjacent deciduous bottomlands.

The uninterrupted forests are home to several other significant woodland species. The Eastern Hemlock and Red Oak-Sugar Maple forests of the 'hog's back' are a stronghold for two of the Rouge Valley's less common breeders, Scarlet Tanager and Ovenbird (Fig. 25). Both of these species prefer extensive tracts of undisturbed forest for breeding (Robbins, *et al.* 1979). Hairy Woodpecker, Wood Thrush and Veery are also found here in their highest concentrations. Red-shouldered Hawks have bred in this area (Speirs, pers. comm.), and Sharp-shinned Hawks have been observed regularly during breeding season over the years (Harpley, pers comm.).

The rivers also provide habitat for such significant fauna as the Redside Dace (a nationally vulnerable fish), and the Northern Water Snake. Locally uncommon mammals such as the White-tailed deer, Northern Flying Squirrel and Hairy-tailed Mole occur here.

Figure 42. The Rouge River valley seen from the crest of the central valley tableland, with oaks and a Big Bluestem clearing in the foreground and rapidly regenerating old fields on the bottomland (JLR 1991).

Figure 43. The small tributary streams of the lower rivers fall off sharply down steep valleys, this one just south of Twyn River Drive on the Little Rouge. Note the high frequency of windfalls across the rocky streambed (JLR 1991).

THEME AREA 3

The Little Rouge Creek valley north of the major hydroline to the CPR line, and west across the upland fields to Reesor Road, is broken up only by the narrow Plug Hat Road, and the infilled Beare landfill access road.

This area supports a good diversity of valley forest types such as: Sugar Maple, Beech, Hemlock, and successional forests (CT 17, 19, 32); Sugar Maple, Red Oak, and Hemlock - Sugar Maple - Red Oak terraces (CT 22, 23, 25); a mixed swamp (CT 8 - the best example in the park); conifer White Cedar forests (CT 20 and 26 - one of the largest stands in the park); and many Variegated Horsetail (*Equisetum variegatum*) meadows (CT 5c - the best and largest examples in the park). The latter community is considered a rare wetland type in site district 7-4. Other Variegated Horsetail meadows are known to occur on Duffins Creek in Durham, in several gravel pits in Peel which have recently been lost to development, and several stations in Halton. The area also supports a high quality tributary ravine forest and associated valley terraces.

The upland field communities connecting the Little Rouge and Rouge valleys between Finch and the CPR line serve as an important wildlife corridor. White-tailed Deer are frequently observed using the corridor, and Bob Johnson (pers. comm.) has noted that Red-bellied Snakes migrate between the woodlots on Reesor Road and the fields in this open corridor.

Eleven regionally rare and one locally rare plant species occur in this area. Most of the rarities are found in the Variegated Horsetail (*Equisetum variegatum*) meadows, such as Slender Gerardia (*Agalinus tenuifolia*), the gentians (*Gentiana crinita*, *G. andrewsii*), and Shining Ladies'-tresses (*Spiranthes lucida*). Several rarities also occur on the Sugar Maple terraces (a mountain-rice (*Oryzopsis racemosa*) and Bearded Shorthusk (*Brachyelytrum erectum*)).

Fifty-five breeding bird species were observed in this area during the 1990 survey. Noteworthy breeding season sightings included Cooper's Hawk, Northern Harrier, Osprey, American Kestrel, Ruffed Grouse, Black-billed Cuckoo, Great Horned Owl, Ruby-throated Hummingbird, Alder Flycatcher, Eastern Phoebe, Bobolink (a grassland species, rare or absent elsewhere during the survey except in theme area 9), and Pine Siskin. All the species of diurnal raptor observed during the 1990 breeding season were recorded in this area, probably because of the combination of relatively undisturbed fields, stream, mixed woodlots, conifer stands and pine plantations. Notable in their absence were several area-sensitive forest-interior species such as Pileated Woodpecker, Scarlet Tanager and Wood Thrush.

Little Rouge Creek provides habitat for the Mudpuppy, Common Map Turtle, and Stoneroller (a nationally vulnerable fish). On the valley slopes are Coyote, White-tailed Deer and the park's only known location for the Blue-spotted Salamander.

THEME AREA 4

This area includes the valleylands of the Rouge River and Morningside Creek south of the Metropolitan Toronto Zoo, to the major hydroline east of Meadowvale Road. The valley has been impacted by the construction of Meadowvale Road and by the installation of the Metro Zoo monorail and Canadian Animal Domain paddocks in the early 1970s. Housing and industrial park developments around Morningside Creek also appear to have negatively affected the creek.

This area has good examples of such valley slope forests as Sugar Maple (CT 17b - one particularly rich slope supports American Ginseng (*Panax quinquefolius*)), mixed [illegible]ock and White Cedar (CT 19), and conifer White Cedar (CT 20 - the largest and best quality examples in the park). There are also good examples of Sugar Maple high valley terrace forests (CT 23), and mixed bottomlands of White Cedar and Hemlock (CT 13b, 14).

The area is noteworthy for supporting the park's only semi-mature forest of White Pine - Hemlock. This forest of 130 year old White Pines is more typical of forests in the northern deciduous-evergreen forest region on the Canadian Shield (site regions 5,6), and is considered rare in site district 7-4 (Riley and Varga 1980).

Significant plants include the threatened species American Ginseng, 9 regionally rare species, and two locally rare ones. Most of these species occur on the Sugar Maple valley slopes and terraces (i.e. American Ginseng, and Canada Waterleaf (*Hydrophyllum canadense*)), and in the Variegated Horsetail meadows (i.e. Slender Gerardia (*Agalinus tenuifolia*), Closed Gentian (*Gentiana andrewsii*), and a sedge (*Carex viridula*)).

A large specimen of Sycamore (*Platanus occidentalis*) is noteworthy on the bottomlands beside the Metro Zoo monorail. This is one of only two Sycamores in the park, at the range limit for this species in Ontario.

Sixty bird species bred in this area in 1990. Noteworthy were American Black Duck, American Kestrel, Ruffed Grouse, American Woodcock, Black-billed Cuckoo, Great Horned Owl, Pileated Woodpecker, Willow and Least Flycatchers, Eastern Phoebe and Ruby-throated Hummingbird, as well as quite fresh pellets of an unidentified smaller owl species (probably Eastern Screech-owl or Long-eared Owl, although Saw-whet Owl is a possibility). The area is notable for its populations of area-sensitive forest-interior species, including woodpeckers, tanagers and thrushes.

This area supports two nationally vulnerable fish, the Redside Dace and Stoneroller in Morningside Creek. On the surrounding uplands, such locally significant mammals as Hairy-tailed Mole, Ermine, Hoary Bat, White-tailed Deer, Coyote, Long-tailed Weasel, and Pygmy Shrew occur. The large number of significant mammals in this theme area reflects the systematic mammal surveys carried out in this portion of the park (deGroot and Carvio 1990).

THEME AREA 5

The Finch Avenue meanders of the Rouge River are the central feature of this area of valleylands, terrace systems, and adjacent tablelands from Morningside Creek to just north of the CPR line, between Sewells Road and Reesor Road. The only road through this section is the narrow Old Finch Avenue.

This area is noteworthy for its high diversity of forest communities, many in a relatively mature condition. Also of note are the exceptionally large and rich valley terrace forests, and the extensive rich tableland forests and swamps, constituting some of the largest upland stands in the park.

Occurring here are the park's best examples of Sugar Maple - Black Maple bottomlands, slopes and terraces (CT 12e, 17a, 23a - uncommon communities in site district 7-4); extensive Sugar Maple terraces (these large relict terraces were formerly floodplains of the Rouge River, *ca.* 10,000 years ago); and ephemeral-ponds in the relict meanders (CT 5).

The uplands are noteworthy for their diverse swamps of Silver Maple, Black Ash (the only examples in the park), Bur Oak - Green Ash (the only examples in the park), White Ash - Green Ash, and successional Trembling Aspen (CT 7). They are the best examples of these swamp types in the park. The uplands also sustain terrestial forests of Beech - Sugar Maple - White Ash (CT 23c - the best in the park), and Sugar Maple (CT 23b,e). The parks only tableland ephemeral ponds are also found on these uplands.

Scattered throughout the area, are the parks largest examples of erosional bluffs (CT 27). These spectacular features reach over 30 meters in height and are well displayed along meanders of the Rouge River north of Finch Avenue.

Significant flora includes 20 regionally rare species and 8 locally rare ones. Most of these rarities are found in the tableland swamps (i.e. Moonseed (*Menispermum canadense*), Climbing Poison-ivy (*Rhus radicans* ssp.

radicans), the sedges (*Carex hirtifolia, C. tuckermanii*), and Spring Cress (*Cardamine bulbosa*)); and in the rich Sugar Maple - Black Maple forests (i.e. Goldie's Fern (*Dryopteris goldiana*), Showy Orchis (*Galearis spectabilis*), Silvery Glade fern (*Athyrium thelypterioides*), and Canada Waterleaf (*Hydrophyllum canadense*)). One Variegated Horsetail meadow also supports Fringed Gentian (*Gentiana crinita*), and Slender Gerardia (*Agalinus tenuifolia*). The park's second Sycamore (*Platanus occidentalis*) is found on the bottomlands just south of the Finch Avenue 'bailey bridge'.

Sixty-nine confirmed, probable or possible breeding bird species were observed in this area, equalling the total for the lower marshes, and indicating exceptional bird diversity for such a small inland site. 1990 breeding season sightings included Green-backed Heron, American Black Duck, Cooper's Hawk, Osprey, Pileated Woodpecker, Chestnut-sided Warbler, Blackburnian Warbler, Black-throated Green Warbler, Mourning Warbler and Orchard Oriole. The area has the park's greatest diversity of breeding season warbler species, and has among the best concentrations of other area-sensitive forest-interior species, including Scarlet Tanager.

Up to three breeding pairs of Great Horned Owls were found here. Cooper's Hawks were regularly seen hunting throughout the area, with one possible nesting location in the deciduous woods west of Reesor Road (a male was observed carrying food into this area). The Finch Avenue meanders were a regular haunt for Osprey, and has been so in previous years (Harpley, pers. comm.). The Rouge's (and probably Metro Toronto's) largest Bank Swallow colony is on the large north-facing bluff at the high meander just north of Finch and east of Sewells Road.

The apparent absence, in 1990, of species such as American Woodcock, Yellow-bellied Sapsucker, Least Flycatcher, Winter Wren, Black-throated Blue Warbler and Vesper Sparrow, which were previously confirmed as breeders in the area (City of Scarborough 1983) may be related to recent urban encroachment. Red-shouldered Hawks have been seen here during breeding season as late as 1985 (unidentified Zoo employees), and Bald and Golden Eagles have wintered here (Harpley, pers. comm.). The locally significant Blandings Turtle, and White-tailed Deer, also occur in this area.

THEME AREA 6

This area encompasses the valleylands of the Rouge River from Sewells Road to Steeles Avenue. The major natural areas occur between Sewells Road and the CPR line, north of the railway to a hydroline, and up to Steeles Avenue as scattered woodlots in the Cedarbrae Golf Course. Stormwater sedimentation or detention ponds constructed in the valley during the 1980s occupy parts of the valley.

Successional forests (CT 32, 33), and old fields and thickets (CT 30, 31) predominate in the valley. Older remnant natural areas support some good quality Sugar Maple, Beech, Hemlock and White Cedar slopes (CT 17, 19) on moist sites; sizeable mixed bottomland terraces of White Cedar - Manitoba Maple (some of the largest in the park); and excellent terrace forests of Sugar Maple (CT 23b), and White Ash - Sugar Maple (CT 12e - the best example in the park). The seepage slopes on the west side of the Rouge River support good meadow marshes and several small semi-mature White Cedar - Hemlock - Yellow Birch stands, a rare swamp type in the park.

This area sustains 9 regionally rare plants and one locally rare species. Some of these rarities occur on a seepage slope (i.e. a clearweed (*Pilea fontana*) and a sedge (*Carex laevivaginata*), and a small Variegated Horsetail meadow (i.e. Slender Gerardia (*Agalinus tenuifolia*), and a sedge (*Carex flava*)

In 1990 this area had 57 confirmed, probable or possible breeding bird species. The mixed early-succession and edge habitats just west of Sewells Road, north of the Rouge River, were host to a surprising mix of unusual species in July, including Northern Mockingbird and Black and White Warbler, which may have been breeders, and Solitary Sandpiper and Northern Waterthrush, which were likely early migrants. A Black-billed Cuckoo and recently-fledged Pileated Woodpeckers were also observed in this area.

The woodlot along the Rouge River north of the CPR line yielded healthy concentrations of more common woodland and edge species, as well as American Redstart and Eastern Phoebe. The stormwater management pond at the hydrolines has emergent cattails, and Great Blue Heron, Green-backed Heron, Blue-winged Teal and Cliff Swallow were observed here in addition to more common waterfowl and shorebird species. Cedarbrae Woods (Fig. 34) had a singing male Canada Warbler during the second week of June. Nationally endangered Loggerhead Shrike formerly nested near the south end of the Cedarbrae Golf Course (O.N.R.S. 1966).

The area also contains the locally significant Mudpuppy, in the Rouge River (one of only two sites for this amphibian in Metropolitan Toronto) and, on the uplands, the White-tailed Deer.

THEME AREA 7

This area includes the Little Rouge Creek valleylands extending from the CPR line to Steeles Avenue. The only major break in this valley is an east-west hydroline.

This portion of the Little Rouge Creek valley sustains mesic slope forests of Sugar Maple, Hemlock and White Cedar (CT 17, 19, 20); and highly diverse, semi-mature terrace forests. Most noteworthy are the terrace forests of White Cedar - Black Maple - Sugar Maple (CT 13c - the only example in the park and an uncommon community in site district 7-4); White Cedar - Hemlock - Sugar Maple (CT 13b); Sugar Maple - Black Maple (CT 12e), White Ash - Sugar Maple (CT 12f - one of only two examples in the park); and White Cedar - Sugar Maple (CT 13d - one of the best examples in the park).

Five regionally rare and 2 locally rare species were found here. Most of the rarities are found in the terrace forests. They include the sedge (*Carex amphibola* - the only stands in the park), Black Walnut (*Juglans nigra*), Canada Waterleaf (*Hydrophyllum canadense*), Bearded Shorthusk (*Brachyelytrum erectum*) and another sedge (*Carex hirtifolia*).

Forty-eight confirmed, probable or possible breeding bird species were observed in this area during the present study. Significant species included Cooper's Hawk (in the Red Pine plantation just south of the CNR), Ruffed Grouse, Great Horned Owl, Eastern Phoebe, Blue-gray Gnatcatcher, Mourning Warbler and Canada Warbler. Area-sensitive forest-interior species such as Pileated and Hairy Woodpeckers, White-breasted Nuthatch and Scarlet Tanager also breed in the mature deciduous forests surrounding the Woodland Park campground. In the 1980s, Yellow-throated Vireo bred in the mature Black Maple - Sugar Maple mid-terrace forest east of Little Rouge Creek (Fairchild, pers. comm.).

The Map Turtle occurs in the Rouge River, and the surrounding uplands have White-tailed Deer.

THEME AREA 8

The tablelands around Finch Avenue, between the two rivers, include the Metropolitan Toronto Zoo grounds and the cultivated fields just north of Finch Avenue. These fields are recommended for restoration of a wide wildlife corridor between the Rouge and the Little Rouge valleys. Most of the area consists of parking lots, animal paddocks, manicured parklands, artificial ponds, pavilions, and cultivated fields.

There are two isolated woodlots of good quality in Theme Area 8. Near the centre of the zoo, is the 'Core Woods,' a mature and intermediate-aged Sugar Maple upland forest (CT 23b - one of the best examples in the park, with some of the park's largest Sugar Maple trees). On the Rouge valley slope towards the west end of the zoo is a semi-mature Sugar Maple forest (CT 17b), and some young White Birch and White Cedar forests (CT 32a, 19g).

This area supports the regionally rare Goldie's Fern (*Dryopteris goldiana*), Canada Waterleaf (*Hydrophyllum canadense*), and the locally rare Silvery Glade Fern (*Athyrium thelypterioides*). These three rarities are found in the mature portion of the 'Core Woods'.

This highly altered area was host to 43 confirmed, probable or possible breeding bird species during the 1990 survey. The only breeding season species of significance were Great Horned Owl and Pileated Woodpecker, found in the forests close to theme areas 4 and 5. An active Red-tailed Hawk nest was found near the western end of the area.

The Zoo's unnatural food supplies, its built ponds and cleared lands, however, have attracted some very interesting migrants, vagrants and wintering species over the years. These include Sandhill Crane (T.F.N.C.N. 1980), Cattle Egret (Fairchild, pers. comm.), Bald and Golden Eagles (Harpley, pers. comm.) and Short-eared Owl (Harpley 1990). Red-shouldered Hawk nested in the Core Woods prior to the construction of the Metro Zoo.

The locally significant White-tailed Deer is commonly observed on the upland fields north of the zoo.

THEME AREA 9

This area encompasses the tablelands between the Rouge River and Little Rouge Creek valleys, north of the CPR line to Steeles Avenue. Most of these tablelands consist of agricultural lands criss-crossed by hydrolines, a CNR line, and three north-south roads. There are four isolated woodlots, a large plantation, and a permanently flowing tributary of Little Rouge Creek. Many of the cultivated fields are also separated by hedgerows, some supporting native forests. It is recommended that wide restoration zones be managed to reconnect the woodlots and tributary stream to the park's major river valleys.

Old fields, hawthorn thickets and young White Elm forests (CT 30, 31c, 32g) occur commonly on regenerating sites around two of the woodlots and along the tributary stream. These are the largest examples of regenerating communities in the park. Wetland communities on these regenerating sites include Canary Reed Grass (*Phalaris arundinacea*) meadow marshes (CT 5b) along the tributary stream, and the only example in the northern half of the park of a Canada Bluejoint (*Calamagrostis canadensis*) meadow marsh (CT 5a).

The older tableland woodlots sustain terrestial forests of Sugar Maple (CT 23b - some of the larger and more mature examples in the park), Beech (CT 23c - about half of the park's stands), and several small Hemlock - Sugar Maple stands (CT 25a). Wetter portions sustain the park's only example of Beech - White Ash - Blue-beech swamps (CT 7g); several small swamps of Silver Maple, and White Ash - Green Ash (CT 7a, 7b); and a few meadow marshes (CT 5f). A former gravel pit along Reesor Road supports several small Variegated Horsetail (*Equisetum variegatum*) meadows (CT 5c).

Occurring in this area are a nationally rare hawthorn (*Crataegus corusca*), 7 regionally rare species, and two regionally rare ones. Most of the rarities are found in the tableland woodlots (i.e. Climbing Poison-ivy (*Rhus radicans* ssp. *radicans*), the sedges (*Carex hirtifolia, C. sprengellii, C. hitchcockiana*), Moonseed (*Menispermum canadense*), and Spring Cress (*Cardamine bulbosa*)); and the hawthorn thickets (*Crataegus corusca* and *C. holmesiana*).

Sixty-five confirmed, probable and possible breeding bird species were found in this area during the 1990 survey. Sewells Forest West (Fig. 34) had Great Horned Owl, Pileated Woodpecker, and a surprising diversity of warblers, including Black-throated Blue, Chestnut-sided, Mourning, Yellow and Common Yellowthroat. Sewells Forest North (Fig. 34) provided the only sighting of Red-headed Woodpecker, as well as an active Red-tailed Hawk nest. Reesor Woodlot (southwest of Reesor Road and Steeles Avenues) had Great Horned Owl, Pileated and Hairy Woodpeckers, Mourning Warbler and Wood Thrush. Vesper Sparrows were common in the hedgerows between cultivated fields. Northern Harrier was observed hunting over fallow fields in mid-June, and the park's highest concentrations of Bobolink and Savannah Sparrow were counted in the field just west of Sewells Forest West. However, this field was ploughed in mid-June, during breeding season.

Other notable species included American Kestrel, Ruffed Grouse, American Woodcock and Red-breasted Nuthatch. Wetland edge species such as Willow Flycatcher, Yellow Warbler and Common Yellowthroat were concentrated in high numbers along the small tributary of the Little Rouge Creek between Sewells and Reesor Roads. Field Sparrow, Indigo Bunting, Brown Thrasher and more common edge species also showed remarkably high concentrations in the area's regenerating fields and adjacent early successional woods.

The locally significant White-tailed Deer is common in the woodlots and the regenerating fields and thickets.

THEME AREA 10

The uplands north from the Beare Road Woodlot to Steeles Avenue, between the Little Rouge Creek valley and Beare Road consist mostly of agricultural lands, cut by two hydrolines, CNR and CPR lines, and Plughat Road. There are three isolated woodlots, two intermittent tributaries of the Little Rouge Creek, several small fields, a White Pine plantation, and deciduous hedgerows. Restoration or regeneration must occur to reconnect the woodlots and the two intermittent streams with the Little Rouge Creek Valley to the south and west, and Petticoat Creek to the east.

The tableland woodlots are largely Sugar Maple and Beech deciduous forests with small mixed stands of Sugar Maple - Beech - Hemlock, White Pine - Black Cherry (the only example of this community type in the park), and Hemlock - Sugar Maple. Along the intermittent streams there are willow-dogwood thicket swamps; cattail marshes, meadow marshes of Canary Reed Grass, cattails, and various herbs; fields; and a small White Cedar grove.

Significant species include the regionally rare Black Walnut (*Juglans nigra*), and the locally rare Great Spurred Violet (*Viola selkirkii*) in the Meadowvale Woodlot (Fig. 34). The woodlot at Plug Hat Road supports the locally significant Mourning Warbler and Chestnut-sided Warbler.

THEME AREA 11

This area is a rectangular portion of the Petticoat Creek watershed, extending from Steeles Avenue south to Finch Avenue, between the Pickering Town Line Road and Beare Road. The uplands are largely agricultural lands criss-crossed by two hydro-lines and a CPR line. There are several isolated woodlots (Barkey Woods and two others; Fig. 34); two swamps (Townline and Carrick's); several large old fields some planted with ornamentals; deciduous hedgerows along the lot and concession lines; a small portion of Petticoat Creek valley; and several intermittent tributaries. Again, regeneration or restoration must occur if the natural areas and streams are to be linked to the Rouge watershed and to the Petticoat Creek watershed.

The swamps are part of the provincially significant Townline Swamp wetland complex, which also includes the wetland swamps east and south of the Beare Road landfill, and the Amos Ponds. The Townline Swamp itself and Carrick's Swamp just south of it support Green Ash swamps, the park's best example of Silver Maple swamps, and the second largest area of open water, cattail marsh and sedge marsh in the park, the largest being in the lakeshore marsh.

The Barkey Woods (Fig. 34) sustain deciduous forests of Sugar Maple - Beech, a Silver Maple swamp, and several small plantations. To the south, in a woodlot along the Townline, is a mixed forest of Sugar Maple - Beech - Hemlock, the largest and best quality tableland stand of this forest type in the park. A small mixed forest of Sugar Maple - White Pine in Barkey Woods is not represented elsewhere in the park.

The lands between this woodlot and the Townline Swamp consist of old fields, with some plantings of European tree species, hawthorn thickets, and young forests of Trembling Aspen. Along the intermittent streams are young forests of Green Ash and White Cedar - White Elm, Crack Willow groves, fields, meadow marshes of Canary Reed Grass and several ponds.

This area supports seven regionally rare plant species and two locally rare species. Most of the rarities occur in the wetlands of the Townline Swamp and the Barkey Woods. These include the locally rare Winterberry (*Ilex verticillata*) and a willow-herb (*Epilobium leptophyllum*), and the regionally rare White Grass (*Leersia virginica*), Canada Waterleaf (*Hydrophyllum canadense*), Eastern Manna Grass (*Glyceria septentrionalis*), American Hazel (*Corylus americana*), Bigseed Smartweed (*Polygonum pensylvanicum*), and Water Dock (*Rumex verticillatus*). The latter three species are restricted in the park to this area.

The Townline Swamp is one of the most significant wildlife areas on the park's uplands. Its wetlands serve as an important breeding site for Northern Leopard Frog, Tetraploid Gray Treefrog, American Toad and Green Frog; a locally important staging and feeding area for water birds such as the Great Blue-heron, Green-backed Heron and Black-crowned Night-heron; and breeding habitat for the locally significant Mourning Warbler, Wood Duck, Virginia Rail, Common Moorhen, Marsh Wren and Pied-billed Grebe. The latter two species were not known to breed elsewhere in the park in 1990-91. Other birds known to have bred in the Townline Swamp include the nationally and provincially rare Black Tern (last observed breeding in 1985), and the regionally rare Red-headed Woodpecker (last observed breeding in 1989; Fairchild pers. comm.).

Old fields between Townline Woodlot and swamp support the park's only nesting Clay-coloured Sparrows, as well as several bird species considered uncommon in the park Brown Thrasher, Willow Flycatcher, Black-billed Cuckoo and Field Sparrow.

In Barkey Woods are the locally significant Pileated Woodpecker and Eastern Screech Owl, while the smaller woods to the southwest supports Yellow-billed Cuckoo.

THEME AREA 12

In the vicinity of the Beare Road landfill there occurs a small Sugar Maple deciduous woodlot, surrounded by the landfill, and upland fields west of the CPR line and east of the Little Rouge Creek valley. These fields were extracted for gravel in the 1950s and regraded with subsoil in the 1960s. The fields support the park's only known breeding Grasshopper Sparrows.

iv) HABITAT RESTORATION AND BUFFERING

The Rouge Valley Park supports numerous linked and unlinked natural areas, and the linkages generally become more remote and lacking towards the north in the park. The rivers themselves, the numerous tributary streams and spring drainways, and the now-isolated woodlots provide a skeleton of natural features which can be linked by restoring forest and wetland conditions in planned corridors (Map 5). This would enhance the viability of now-isolated woodlots, restore stream and river corridors, and infill disturbed areas within otherwise continuous forested tracts. Many of these potential corridors are already abandoned fields with advanced woody regeneration by appropriate native, successional species.

In restoring natural corridors and forested habitats in the Rouge Valley Park, the following principles are proposed. They derive from the general principle that ecosystem fragmentation has an effect opposite to ecological 'synergy'; individual parts are less than their portion of the whole.. The term 'restoration' is used to describe the deliberate reestablishment and reconnection of natural habitats, using the present native vegetation of the park as templates and keying on the presettlement vegetation of the area. (It should be noted that broadscale tree planting to sequester excess atmospheric carbon dioxide is a topical concern (Byrne 1988, Sedjo 1989), but not appropriate in near-natural park settings, where similar benefits can derive from much more carefully planned plantings designed to link fragmented systems (Wilcove 1987)).

1) **Native species, of local provenance**, should be planted (Millar and Libby 1989, Ambrose 1990). Such species are pre-adapted to the local conditions, and already constitute the genetic biomass supporting the park's wild life. In several areas of the park, dense regeneration is already occurring in abandoned fields, and these sites may be sources of stock of successional species for other areas in the park. Park planning must anticipate needs for hardwood species such as maple, beech and oak, using local seed sources, either through an on-site nursery or an arrangement with an existing nursery. Exotic species should not be considered unless in exceptional circumstances, such as an arboretum or historical, 'period' landscaping.

2) **Natural restoration processes** should be given every opportunity to restore corridor areas. Open areas near forests normally receive a rain of forest seed, and many areas like this in the Rouge already enjoy advanced regeneration by numerous woody, successional species such as ash, poplar, aspen, willow, cherry, birch, basswood and White Pine. Where spontaneous regeneration is slow, the same common pioneer species should be used, and will succeed on exposed sites with organically-depleted soils. Local shrubs can play an important role in diversifying habitat characteristics; native dogwood, viburnum, hawthorn and sumac, for example. In anticipating the secondary succession by maple, beech, oak, or others, the composition of adjacent forests with similar site conditions should act as a model. Restoration should **build on and imitate existing local communities** of the park.

3) Habitat restoration should also address the **elimination of aggressive alien species**, such as the Dog-strangling Vine, Common Buckthorn and others (Fig. 38). Practically speaking, such efforts may be expensive and experimental, and may require volunteer involvement to ensure success, especially with respect to monitoring. It would probably be practical to preferentially focus on the elimination of such species from nature reserve areas of the park.

4) **Aquatic habitat restoration** for fish communities should be based on the objective of enhancing naturally reproducing, self-sustaining populations. Remedial plans to improve fish habitat should be done in conjunction with other specialists, to ensure that other resources are also considered. In the park, this is particularly important with respect to changes in riparian corridors, the creation of new wetlands, and the rehabilitation of the waterfront marsh.

5) **Priorities for restoration of terrestrial habitats**, based on these principles, are reflected in the areas recommended on Map 5. These recommendations cover 370 ha (Map 5). Significant

additional regeneration could be undertaken in the park if there was the intention to create extensive forest tracts between Finch and Steeles Avenue. Even in that case, the same restoration principles should apply.

i) **Buffering of existing natural areas**, especially along transportation, access and utility routes: south of Highway 401 and between Highways 410 and 2; at the lakeshore parking lot and fields on adjacent uplands; along Meadowvale Road; the tablelands west of the Zoo above the Rouge River (south of Finch); along the Beare Road landfill access road; etc. Restoration planting may be required to ensure such buffering occurs as close as possible to these disturbed areas, especially if that planting results in narrower disturbance corridors and quicker results.

ii) **Underplanting of utility corridors**, especially on slopes and bottomlands. It would be appropriate to address this priority jointly with Ontario Hydro, so that their longterm management plans and the park's expectations of habitat linkage can be mutually supportive.

iii) **The two river corridors, in particular between Finch and Steeles Avenues**, are no longer primarily forested or in thickets or native swales. Priority should be given to efforts to renaturalize bottomland and slope areas. The benefits include stabilization of banks, the shading of waters, the contribution of woody materials to the rivers, and the improvement of fish habitat. The largest break in the river corridors occurs on the Cedarbrae Golf Course, which should be encouraged to restore the riparian corridor and other valley lands, and minimize their use of biocides and fertilizers.

iv) **Other riparian corridors**, the streams and seasonal drainways, also require restoration to stabilize banks, cool waters and contribute organic matter to aquatic ecosystems. Particular emphasis should be given to Morningside Creek, and to the two larger tributary streams of the Little Rouge Creek, which themselves connect existing forest areas, and which will probably support riparian wetland corridors with minimal efforts.

v) The restoration of river and stream corridors should be planned in the context of the **restoration of corridors between isolated upland woodlots and the valleys**, in the area north of the Canadian Pacific Rail line (Map 5). Some corridor areas are already regenerating. The tableland area north of the Metro Zoo, **between the two river valleys** is recommended as one of the highest priorities for restoration because it offers the most practical opportunity to reestablish a major connection between the major valleys anywhere in the watershed north of the Metro Zoo.

vi) **Setbacks** from existing woodlots and forest edges and, possibly, **'shield' plantings** of locally native conifers around some woodlots would reduce interior edge effects such as increased radiation, desiccation, windthrow, etc., and increase the depth of the interface between natural areas and urban activities, especially at the edges of the park.

vii) The Metro Zoo and Save the Rouge have expressed interest in **wetland restoration**, and numerous small basins may be possibilities along existing streams and drainways. Small wetlands occur on the clay portions of the Halton Tills of the area, and the size of artificial wetlands should be in keeping with the present landscape. Water budgets should be calculated for artificial wetlands because flow rates are low on the tributary streams and drainways, and evaporation rates are high. Such wetlands may have a negative effect on the temperatures of waters discharged from them, and the blocking of existing watercourses may impact on discharge rates into the Rouge and Little Rouge. Seasonally flooded wetlands may be a viable alternative in some instances, as this is the normal regime in most of the tableland swamps. These also have less thermal impacts on fisheries.

6) **Direct management to maintain particular community types** may be appropriate where natural succession, in the absence of natural disturbances like fire, may result in the elimination of some forest types and species (Chapter II.ii). For example, ground fires may be a desirable management technique to maintain and restore the drier communities on the present oak slopes and interfluvial tablelands, especially on the sandy soils near the valley crests south of the old Lake Iroquois shoreline.

Restoration opportunities in the park are numerous and complex, and should be part of the ongoing operation of the park. They should be guided by a **vegetation management plan**, based on the above principles and priorities, to guide managers and volunteer agencies, and to establish the necessary protocols for recording and monitoring restoration efforts. This latter effort is important because restoration projects are, by their very nature, experimental, based on local conditions and opportunities. For example, conclusions reached elsewhere, such as that forested corridors may need to exceed 100 m in width to sustain beech and 30 m in width to sustain Sugar Maple (Ranney *et al.* 1981), may or may not be relevant in southern Ontario.

Whether through restoration or natural succession, in-valley viewscapes will change rapidly over time, and be constrained. For example, the open bottomlands along the Rouge River south of Twyn River Drive will close quickly with willows, poplars and Manitoba Maple. The costs and benefits of maintaining open viewscapes should be considered in restoration plans, and in planning trails.

Species Restoration and Reintroduction

A number of native species have been documented historically as occurring in the park, for which the reintroduction of naturally reproducing, self-sustaining populations may be feasible. For example, River Otter have not been known in the park since the 1950s, nor have breeding Red-shouldered Hawk since 1985. Atlantic Salmon is one of only three native Ontario salmonid species. In such cases, the reintroduction of species may be appropriate if, after careful feasibility studies, there appears to be a high probability of success in reestablishing self-sustaining populations.

The presence of professional staff at the Metropolitan Toronto Zoo offers unique support opportunities for reintroduction projects. At the same time, any wildlife reintroductions must consider the special responsibilities that the Zoo has for managing a wide diversity of species, native and exotic, which may be effected by some wildlife reintroductions. Especially in the urban context of this park, feasibility or 'recovery' plans must also consider community impacts, and encourage community involvement.

There is considerable current interest in developing specialist vegetation communities, especially wetlands, prairies and 'Carolinian' forests. If such communities are not modelled on extant, local communities, they should be clearly considered as separate horticultural, arboretum or interpretative projects, and carefully managed and monitored to avoid ecological impacts on existing communities. With respect to plants, the principles adopted by the Conservation Committee of the Canadian Botanical Association (Fahselt 1988), should be considered in such reintroductions, and incorporated in their interpretative messages.

All the ecosystem management activities undertaken in the park should be undertaken by design, and photographic and quantitative records should be accumulated as part of the core records of the park, to provide baseline information for future management decisions. Monitoring is especially important in the case of rare or other wise featured species, populations and communities (Palmer 1987), and **restoration or reintroduction projects should not be undertaken unless appropriate planning, recording and monitoring is assured.**

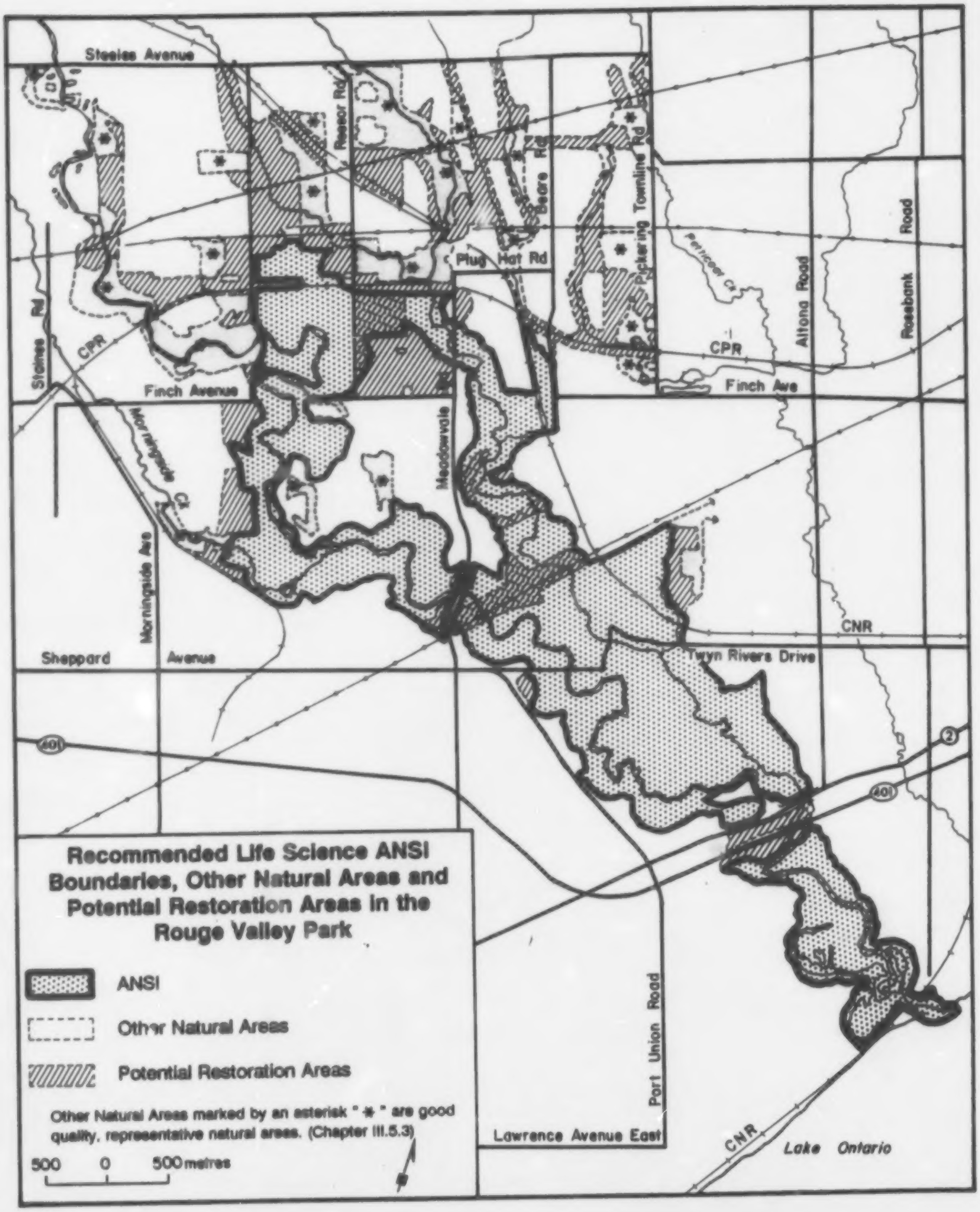

Steeles Avenue
Reesor Rd
Beare Rd
Pickering Townline Rd
Petticoat Ck
Altona Road
Rosebank Road
Plug Hat Rd
CPR
Steeles Rd
CPR
Finch Avenue
Finch Ave
Morningside Ck
Meadowvale Rd
Morningside Ave
Sheppard Avenue
Twyn Rivers Drive
CNR
401
2
401
Port Union Road
Lawrence Avenue East
CNR
Lake Ontario
Recommended Life Science ANSI Boundaries, Other Natural Areas and Potential Restoration Areas in the Rouge Valley Park
ANSI
Other Natural Areas
Potential Restoration Areas
Other Natural Areas marked by an asterisk " * " are good quality, representative natural areas. (Chapter III.5.3)
500 0 500 metres

Figure 44. Recommended life science ANSI boundaries, other natural areas and potential restoration areas. (Data on northeast quadrant from Kamstra 1991.)

v) RECOMMENDATIONS

1. Stewardship

During the past three decades, the ownership and land uses of the Rouge Valley Park have changed dramatically, from private ownership by residents, farmers and businesses, to predominantly public ownership by the Metropolitan Toronto and Region Conservation Authority and the Ministry of Government Services, with additional smaller holdings by the Ministry of Transportation, Ontario Hydro, other utilities, and a number of small privately owned parcels.

The management of these public lands over this period has involved the removal of valley residences, the closing of several roads accessing the valley and many other vehicle trails, and the removal of in-stream dams, among other environmentally beneficial actions. Other activities reflected then-current, and less beneficial, concepts of appropriate land management, such as developing the lakeshore marsh for car-based angling, infilling valleyland for a campground, clearing a slope for skiing, constructing animal enclosures in the valley, building in-valley and in-stream stormwater management structures, and armouring small portions of the Rouge and its tributaries.

On balance, however, the stewardship of the study area has been a fortuitous coincidence of acquisition and passive management by public agencies, the M.T.R.C.A. primarily as a result of the regional effects of Hurricane Hazel, and M.G.S. as a result of a government decision to land-bank in anticipation of future housing needs. In the absence of aggressive land management and development, the natural processes of forest regeneration, riverbank erosion and accretion, and marsh succession were allowed to proceed without interference in the valleys and the tablelands of the study area.

The public agencies and private owners who have acted as stewards of the natural heritage of the study area for the past 35 years and more, should be commended on their stewardship roles, which have served to protect for posterity the largest and most significant valleyland natural area in the Greater Toronto Area. They preserved the present option of having a nationally significant park along the lower river valleys feeding northwestern Lake Ontario. It will be a challenge to the custodians of the park to match that record in the next 35 years.

2. Natural Heritage Protection and Management

It is recommended that the goals of natural heritage protection and management adopted by the Rouge Valley Park Advisory Committee (June 1991) should be applied to the management of the park as a whole; 'To protect and restore the natural ecosystem of the Rouge Valley Park, and promote the health and diversity of the park ecosystem, its native species, landscapes and ecological processes.'

Management of the park will necessarily focus on the management of human activities. Consequently, the known ecological and social impacts of those activities should be deliberately assessed against the principles of diversity, ecological functions, health and condition, succession and restoration, and education and appreciation of the natural heritage.

The condition and health of native communities, species and the landscape in general should be sustained and enhanced through appropriate planning and management, recognizing the past natural history of the area. The changing conditions of particular areas within the park should be assessed by maintaining good documentation of the present character of the park, and using those base-line measurements to assess future impacts of park activities, and the external influences of regional land uses, climate change, atmospheric pollutants and pathogens. This scientific monitoring role is uniquely compatible with the long-term management of the site as a park, and should be a priority of the park and of cooperating partners, such as the Metropolitan Toronto Zoo.

Monitoring over time is also the key to assessing the 'acceptable levels of change' resulting from specific park activities, whether for trail systems, access facilities, or restoration projects. The 'carrying capacities' of specific areas for specific activities are not known, and they will only be known through the comparison of baseline data and subsequent monitoring.

3. Natural Area Boundaries and Zoning

The study area contains a remarkable diversity of natural and rural landscapes, on which is superimposed the modern infrastructure of railways, expressways, roads and utility routes.

In very general terms, the study area north of the Canadian Pacific railway is a predominantly rural landscape, with a rectilinear pattern of roads, fields and fencerows, through which rail and utility corridors are relatively frequent. Natural areas are confined to isolated woodlots and the two valley corridors. To the south of the Canadian Pacific railway, the valleylands and tablelands, with the exception of the developed portions of the Metropolitan Toronto Zoo, form a more or less continuous natural landscape of forests, rivers, swamps, marshes and regenerating valley fields.

The inventory and evaluation of life science values of the study area have built on previous studies of the area by Ministry of Natural Resources' projects, Environmentally Significant Area studies by the City of Scarborough and the Conservation Authority, and studies by the Metropolitan Toronto Parks Department, staff of the Metropolitan Toronto Zoo, and many naturalists and resource professionals. Those studies identified numerous provincially, regionally and locally significant natural areas in the park (Fig. 34), which have been confirmed through the present ecological survey.

The portion of the study area fulfilling the criteria for the selection of a **provincially significant Area of Natural and Scientific Interest corresponds with the area between the outside crests of the two valleys, extending from near the Canadian Pacific railway south to Lake Ontario** (Fig. 44, Map 5).

Because of their present land uses, condition and non-native ecosystems, several areas were excluded from the ANSI.

- The lakeshore parking lot, access road and beach facilities;
- The corridor at Highways 401 and 2;
- The Glen Rouge campground;
- The disturbed valley slopes near Sheppard Avenue and Twyn Rivers Drive;
- The parking lot along Twyn Rivers Drive;
- The developed portions and isolated woodlots of the Metropolitan Toronto Zoo, and the Meadowvale Road access corridor;
- Several 'envelopes' around existing buildings and landscaped grounds

A few areas extending beyond the valley crests to the east and west of the main valley, and north of the Canadian Pacific railway, have also been included in the ANSI.

- The remaining, contiguous, high quality natural areas immediately east of the Little Rouge Creek; i) just south of Twyn Rivers Drive, ii) just north of Twyn Rivers Drive and the Canadian National railway; iii) a small tributary corridor and associated forest slopes and tablelands near Finch Avenue and Beare Road.
- The lower Morningside Creek area immediately west of the Rouge River, including steep forest slopes, tableland and ridges.
- The contiguous, forested natural area immediately north of the Canadian Pacific railway just east of Sewells Road.

Several interior areas within the recommended ANSI are included because of their roles as corridors and habitat linkages, and because of their potential contribution to the overall continuity of the ANSI. These sites are mapped as areas having potential for restoration (Map 5).

- A small tableland field just south of the lakeshore railway, east of the river mouth.
- The hydro corridor crossing the valleys from Meadowvale Avenue in the west to the Beare Road landfill in the east.
- The access road to the Beare Road landfill (the only river crossing in the park which is by culvert).
- The Valleyhalla area on the slopes and bottomland of the Little Rouge Creek.
- The fields on the tableland between the two valleys, north of Finch Avenue and south of the Canadian Pacific railway.

The recommended ANSI is a large (810 ha) and compact natural area designed around the most significant geomorphological and ecological theme of the study area, specifically the lower Rouge River valleys. It includes most of the significant species, communities and natural landscapes of the park, in excellent condition, and in sufficient size and shape to suggest that natural processes can continue to dominate, and that the present species and communities can be reproductively viable in the long term.

i) **It is recommended that the area identified as the life science Area of Natural and Scientific Interest in the park (*ca.* 810 ha) be managed as a 'nature reserve zone'.** Park management planners should adopt definitions for 'nature reserve zones', and define the activities compatible with such zones, paralleling as much as possible the protection objectives associated with such zones in the Provincial Parks system.

ii) Elsewhere in the park outside the ANSI, other natural areas have been inventoried, evaluated and mapped (245 ha; Fig. 44, Map 5). These are good quality, representative natural areas, such as the woodlots, valley tracts and tributary corridors typical of the area, **it is recommended that these 'other natural areas' also be managed as nature reserve zones in the park.**

4. Natural Area Restoration and Buffering

The majority of isolated natural areas in the northern part of the park are aligned along the river valleys and the small tributary streams and drainways flowing into the river valleys. A number of other woodlots are surrounded by old fields. **It is recommended that ecosystem succession and the potential for ecosystem restoration be an important theme in the management of the fragmented landscape of the park** (Chapter III.iv). Restoration initiatives should be based on principles such as **the use of native species, of local provenance, modelled on the local vegetation communities, respecting the processes of natural restoration** wherever advanced regeneration is already underway. **Passive restoration management should be the preferred approach in most areas.**

It is recommended that the principles and priorities of vegetation restoration be included as part of the park management plan, as well as guidelines for planning, documenting and monitoring such activities. At a minimum, priority should be given to the following restoration initiatives, which are presented in more detail elsewhere in this report (Chapter III.iv, Map 5). The following areas total 370 ha.

- Buffering of existing natural areas from transportation routes, parking lots and utility corridors.
- Underplanting utility corridors, and managing the corridors as wildlife habitat.
- Restoring the two river corridors between Finch and Steeles.
- Restoring other riparian corridors.
- Restoring corridors between isolated upland woodlots and the valleys.
- Restoring a major upland linkage between the two river valleys across the agricultural lands between Finch Avenue and the Canadian Pacific railway.
- 'Shield plantings' to buffer existing forest edges.
- Small-scale wetland restoration projects.
- An on-site nursery, or arrangements with existing nurseries or future zoo nurseries, for native local stock.

The areas where natural and active restoration are priorities (Map 5), should be identified as 'potential restoration zones' in the park management plan.

Natural ecosystem regeneration to forest occurs relatively rapidly in southern Ontario, as shown by the historic aerial photos of the Rouge. This should be considered by park planners if there is any intention to maintain in-valley views, or the rural fields and fencerows south of Steeles. In any case, the present fencerow system should be protected as much as possible, as it provides shelter, privacy and connecting links across that otherwise open landscape.

Areas where there are aggressive alien plant species, such as the Dog-strangling Vine, should be considered as special management areas. Particularly in nature reserve zones, efforts should be made to monitor and eliminate these species. Mute Swans and Canada Geese in the lower marsh have increased tremendously from 2 breeding pair in 1973 to over 150 adults in June 1990; their role in the decline of other waterbirds in the marsh should be considered, and experimental reductions in their numbers attempted.

Rural land uses which are maintained in the park, as well as all other land uses and activities, should follow exemplary land stewardship practices. For example, present agricultural practices in the park require deep ploughing, and biocide and fertilizer applications, and should be reviewed carefully with respect to their impacts on tributary streams and the longterm conservation of the soils and water of the park.

5. Land Uses

Many past and present activities in the study area have left residual negative impacts on the park and on its significant natural features. The following items are not in order of significance, but proceed generally from the lakeshore towards the northern boundary of the park.

- The present parking lot in the lower marsh was infilled in the early 1960s and expanded in 1975 to provide parking and angling opportunities (Fig. 45). This infill reduced the available area for breeding marsh birds, and allowed automobiles into the marsh. Since 1973, the marsh has lost its populations of Black Tern (35 nests in 1973), American Coot, Marsh Wren, Green-backed Heron and American Bittern, all significant breeding birds, and has lost large areas of submergent aquatic vegetation. **The parking area should be removed from the lower marsh. and the access road to the beach should be reduced in width and screened from the marsh by shrub and tree cover, at a minimum. Regrading and revegetating the marsh edge would be beneficial to the marsh's fishery, particularly if it enhances Pike spawning habitat. Viewing and fishing opportunities should be redesigned. Parking opportunities at the entrance gate area above the valley, and alternate pedestrian access to the beach, across the railway, should be evaluated.**

- The small natural shoreline to the east of the river mouth has changed its configuration considerably over the past 50 years (Chapter II.vi and III.iii, Fig. 33). At present, it is at its smallest size in several decades, is often littered with garbage (July 1991) and has seriously compacted shore-edge trails. **Armament to the roadway under the railway bridge should be minimized, or removed, if it deflects flow to the east, as this may reduce the chances of future accretion of this fragment of natural Lake Ontario shoreline. Efforts at cleanup, a railing to discourage access, and cautionary signage of the area as an area of 'natural regeneration' would be appropriate.**

- Powerboats were prohibited from the lower Rouge River valley by Metropolitan Toronto Council (June 18, 1974), based on observations (Wainio *et al.* 1973a) of the impact of powerboats on floating nests of waterfowl, shore erosion, swimmers, canoeists, water pollution and noise levels. **The legal status of this prohibition should be confirmed, and posted.**

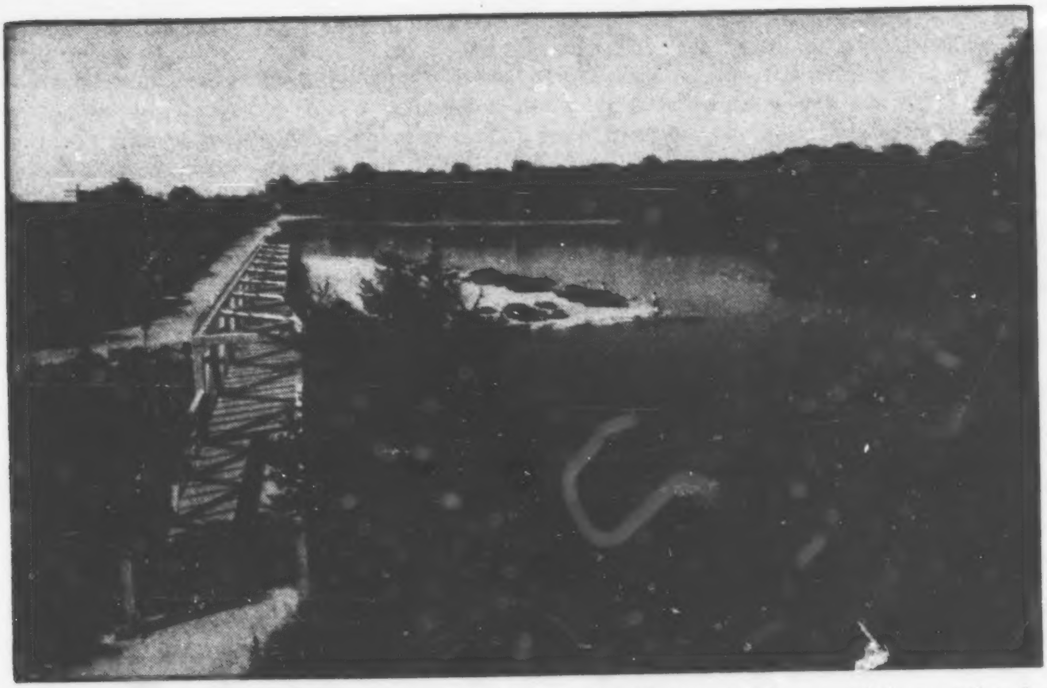


Figure 45. The Rouge Beach parking lot, pedestrian bridge, rail embankment and armoured rivermouth under the rail bridge (JLR 1991).

Figure 46. Equestrian trail up steep slopes of the central valley tableland (JLR 1991).

- The lakeshore marshes are generally well buffered from pedestrian access by open water channels at the base of the perimeter slopes. Some access trails approach the back marshes from upstream. **Access trails to the lower marshes should be signed to notify hikers of the significance of the marsh, and to prohibit the running of dogs in the area. The concentration of breeding waterfowl in the marsh, and their recent decline, warrants consideration of closing the cat-tail marsh, graminoid meadow marsh and back channels to pedestrians and boat traffic during the breeding season (late April to July).**

- The Highway 401 & 2 corridor is much wider than the highways themselves, and reforestation is recommended. Additionally, the corridor contains numerous areas where surface erosion into the river should be mitigated. The design of the roads to channel runoff, and salts, into the river should be revisited. Pre-design discussions should be held to influence the design of the planned expansion of the Highway 401 bridge; an assessment of environmental impacts should be made, and the restoration of vegetation to the highway edge should be required.

- In the natural areas of the park, anywhere south of Finch Avenue, a confused network of trails has proliferated over the past twenty years. The majority are pedestrian trails, but some are equestrian and mountain bike trails, and some are used by walkers and riders alike. Many of the pedestrian trails are very wide, many of the equestrian trails (including those through the riverbeds) are significantly eroded (Fig. 46). Some badly eroded equestrian trails on steep slopes between Highway 2 and Twyn Rivers have been rendered useless for anyone, abandoned, and realigned across fresh slopes.

  The present trails in the park should be mapped and documented in terms of their condition (erosion, depth, width), and where they are accessed. The trail system in the park must be reduced and rationalized, especially in relation to i) their present condition, ii) the unacceptable access points they serve, iii) their duplication in many areas, iv) their interpretive usefulness to the park, and v) the ability of park managers to maintain the trail system over time. The present equestrian use of trails on the slopes and tableland of the central valley should be stopped, and equestrian trails in the park as a whole should be reviewed as part of the park management plan.

  There is only one formal nature reserve in the Greater Toronto Area south of Lake Simcoe or in site district 7-4 (Bronte Creek N.R. Zone). The recommended nature reserve zones in the Rouge Valley Park are among the only possibilities for future reserves in this urban area. For this reason, **the trail system, access points and level of use considered for the valleys and tablelands of the recommended ANSI and other natural areas must avoid impacts on sensitive areas**, such as to the many rare and sensitive species and communities (Maps 3,4,5), to the breeding birds of the forest interior (Hickman 1990), and to the breeding birds of the lakeshore marshes. For example, the number of trails heading north and south from Twyn Rivers Drive should be reduced on the forested uplands and slopes, especially on the interfluvial tablelands, while the use of trails in the open bottomlands and regenerating old fields in the same area might be encouraged through signage and access control.

  There are very few access points, trails or trail-heads in the park north of the Canadian Pacific railway, an area which appears to have a greater carrying capacity for multiple-use trails than the park's southern valleylands and naturally-vegetated tablelands.

  In the long-term, trails in the Rouge Valley Park may become **links in a regional trail system**; the present park management plan should consider the additional pressures such trails may be required to bear. To this end, and to minimize impacts on the interior of the park, consideration should also be given to a perimeter trail system, along the tableland crest on the east side of the Little Rouge Creek north from Highway 2, and along the tableland crest on the west side of the Rouge River north from Highway 2, with links in the Glen Rouge Campground area and near Steeles. Such a trail must be far enough back from the valley rim to avoid the dry forest clearings and the numerous rare plants they support.

- The Metropolitan Toronto Zoo has begun to phase out the bottomland paddocks it has used for large ungulates over the past fifteen years (Rapley, pers. comm.) Ground cover in those paddocks was removed, surface erosion was considerable, and the fencing fragmented the natural habitat of the valley. **The Metro Zoo should be commended on this initiative, and encouraged to continue reducing the Zoo's impacts on the bottomlands, restoring it as much as possible to the real 'Canadian domain'.**

- The Morningside tributary was, until recently, one of the most pristine and secluded valleys in the park, supporting Red-shouldered Hawk and other raptors. Since then, it has become the major stormwater receiver of the Tapscott industrial area and the Malvern community. Increased peak flows continue to actively erode the Morningside tributary, and the streambed has been significantly lowered. Horsetail meadows which were streamside 15 years ago are now perched many feet above the streambed. The stormwater and sediment are exported to the Rouge River. **The City of Scarborough and the Conservation Authority should undertake a stormwater management study of the Morningside Tributary, based on its past, present and future flow conditions, and adopt a plan to reduce the cumulative negative impacts of stormwater discharge on this tributary.** Stormwater control should be based on buffer zones, setbacks, volume controls that enhance local infiltration, and sediment controls (M.O.E./M.N.R. 1991).

- To avoid the history of other watersheds in Metropolitan Toronto, like the Don River and Highland Creek, strict regulatory controls must be enforced on the management of the Rouge and Little Rouge watersheds as a whole, so that the quality of the water resource is protected and enhanced over time. The fate of the aquatic ecosystems of the park's rivers and lakeshore marshes depends on this. Stormwater controls should reduce the amount of impervious area in the watershed and restrict the discharge of stormwater to sewers and streams. Vegetative and design practices should enhance infiltration, and stormwater quality ponds should be considered as a 'last line of defense' (M.O.E./M.N.R. 1991).

The Conservation Authority and its partners should be encouraged to implement the Comprehensive Basin Strategy for the Rouge River Watershed, and Fisheries Management Plan (M.T.R.C.A. 1991), and commended for adopting as a goal the restoration of aquatic ecosystems. The adoption of target fish species representing the desired fish communities and habitats (i.e. Rainbow and Brown Trout in the park's rivers and Largemouth Bass in the marshes) expresses a strong commitment to restoring riparian corridors along watercourses, protecting groundwater discharge and recharge areas, and reducing water temperatures and sediment loads. Such changes should also support the present diversity of fish species in the park (55 species), and the population levels of the two vulnerable species presently known in the park.

For the tributaries draining to the rivers in the park, the Conservation Authority must continue its policy of i) requiring master drainage plans, stormwater management plans, and erosion and sediment plans, ii) preventing any increase in runoff, and iii) ensuring that the 'user' pays to control runoff impacts at source. Monitoring the sediment loads and turbidity levels in the river and marshes following storm events of known scales should also be undertaken to provide comparative data on water quality at the bottom of the watershed, where sediment loads and turbidity levels appear to have increased since 1973.

Some of the installations for stormwater management inside the park include, in addition to those on the Morningside tributary and along highways, at least 6 major stormwater discharge points from residential and industrial areas and the Beare Road landfill, 2 in-valley stormwater detention ponds (with access roads), 2 tableland detention ponds at the Beare Road landfill, armoured tributary streams, and reinforced riverbanks. **Every effort should be made in the future to avoid the installation of stormwater management structures in the natural areas of the park, and to ensure that stormwater management in adjacent areas has no negative impact on the aquatic or terrestrial ecosystems of the park. The present installations, such as the stormwater discharge points and**

detention ponds, should be monitored to ensure they are performing to design specifications. Serious consideration should be given to retrofitting existing stormwater discharge outlets with tableland detention ponds, for example, at Highway 401, Morningside Creek, and the Metro Zoo.

- In areas where high density residential developments and industrial developments border the park, as will be more and more the case in the future, it will become increasingly important to **install boundary fencing and signage**, to discourage dumping and 'adoption' of parkland as backyard, and to encourage the use of designed access facilities. The boundary between Malvern and the park, south of Finch Avenue, is an example. City of Oakville Parks staff have considerable experience with the management of urban natural areas, and should be contacted in the course of Rouge Valley Park management planning.

- Numerous other land uses in the park should be reviewed and rationalized in the park management plan, because they have long-term effects on the maintenance of natural areas of the park.
  - The road and access systems (particularly the over-used and underbuilt Twyn Rivers Drive, and the Bear Road landfill access road, and others).
  - The Metro Toronto Parks Department's nursery and composting facility.
  - Ontario Hydro's requirements for corridor access, transmission upgrades or expansion, and river crossings.
  - The Zoo's requirements for composting and for hay, straw and grain.
  - Roadside dumping, general littering, theft of trees, shrubs and wildflowers, harvesting of fiddleheads, and other illegal activities which enforcement alone can prevent.

6. External Influences

The activities of adjacent property owners are important because they are effectively the buffer between the park and the surrounding community. However, the negative aspects of such activities can be overstated. In a series of interviews with 114 of the 160 landowners flanking the valley south of Highway 401 (Wainio *et al.* 1973a), 85% maintained the valley slopes in a natural state, 75% expressed their major reason for enjoying their homes as the "proximity to nature", and 96% favoured the establishment of a "conservation preserve" in the valley. A very small number of landowners have been obvious exceptions, who have infilled the marsh, terraced their slopes, or installed marsh-side lawns.

There is reason to believe that adjacent landowners would respond similarly in 1991, based on the groundswell of public support to 'Save the Rouge' and the political decisions to do so. From other projects encouraging private natural heritage land stewardship, such as the Carolinian Canada Project, it is clear that private stewardship can be very effective in conserving significant natural areas, particularly where inappropriate general access may result in negative impacts.

Natural heritage stewardship of the valley by the general public and by adjacent landowners should be encouraged through the organization of a 'friends of the Rouge' group, through informative natural history communications within the local community, and through stewardship agreements with, and awards for, landowners whose lands abut the Rouge Valley Area of Natural and Scientific Interest.

The external influences of the community at large, rather than individual neighbours, are of more consequence and impact. These range from housing developments, sewage disposal, stormwater discharge and arterial roads, to regional infrastructure such as hydro and expressway corridors, pipelines and railways. Even further afield are systemic external influences such as atmospheric pollutants, climate change and moderated Lake Ontario water levels.

Where practical and achievable, the environmental impacts of activities outside the park should be addressed in relation to the park ecosystem, particularly for those activities upstream in the Rouge watershed and in the municipalities both east and west of the Rouge Valley Park. Where practical and achievable, the corridors linking natural areas beyond the park boundaries should be planned as part of a regional natural heritage system; east and west along the lakeshore, upriver on the Rouge River and Little Rouge Creek towards the Oak Ridges Moraine, and eastward along hydro lines and tableland forests to Petticoat Creek, Altona Forest, and the Duffins Creek.

7. Natural Heritage Education and Appreciation

In urban environments it is especially important to promote high levels of appropriate, particularly educational, use of significant natural heritage resources such as the Rouge Valley Park.

The feasibility of formal outdoor education facilities servicing local Boards of Education should be evaluated. Expansion of the Metropolitan Toronto Zoo's interpretive programmes may be appropriate, especially as they deal with the ecosystem in which the Zoo operates. Naturalist literature can be made more accessible and usable, such as booklets on the "Birds of the Rouge Valley Park" and other subjects. Trails should be rationalized in the Park with education and interpretation in mind, involving self-guiding trails and trails with posted signage. The Metropolitan Toronto Zoo may be an appropriate trail-head for valley and tableland trails; such trails could link to stations on the Canadian Domain monorail. Self-guiding, interpretive kiosks may be important education tools near access points, such as at the lakefront marsh and beach.

Park planners should review options for natural heritage education and appreciation with respect to their cost and effectiveness in servicing large numbers of visitors in an environmentally friendly fashion.

Interpretive themes of special relevance in the Rouge Valley Park could include:

- **Living with the Lake**; Lake Ontario's shores and marshes, water quality and aquatic ecosystems, water level changes over time, marsh dynamics over time, warm water fish communities, wetland functions and conservation.

- **Wild in the City**; the park as an island in an urban environment, and a link from the lake to the rural lands north of Toronto; the park as the last refuge in Metropolitan Toronto for many species and communities; the role of the community and citizens in keeping wild places in the city.

- **Historic Landscapes of the Rouge Valley Park**; ecological change in the landscape as it relates to First Nation's use of the park, European settlement, forest clearing, mills, dams, diversions, boat building, extirpation of Atlantic Salmon, breaking the ground for crops, field and fencerow landscapes, Hurricane Hazel, remnant woodlots, mining the river gravels, aggregate extraction, regional landfills; public land acquisition and the 'healing' of the valley.

- **River Dynamics**; water quality and aquatic ecosystems; warm water and cold water fish communities, and their requirements; Hurricane Hazel and its effects on the Rouge watershed; watershed planning; community planning and stormwater management; processes of erosion and accretion.

- **Ecosystem Restoration**; natural community succession over time from cleared lands, through early successional communities to thicket, swamp and forest; 'kick-starting' succession by mimicking local examples of community succession; small-scale wetland restoration and creation; restoration of riparian corridors along tributary streams; restoration of heavily degraded hydro and road corridors; 'shield' plantings around woodlots and forest edges; eradication of invasive alien species such as Dog-strangling Vine.

- **The Upland Forests**; the diversity of forests in the Rouge; forest community succession and maturation; old-growth themes, such as old, dying, dead and downed trees, and their roles; forest cores, corridors and connecting links; area-dependent and edge-sensitive birds; wetlands in the forest; the spring flora.

- **The Bottomland and Terrace Forests**; similar themes to those above but with emphasis on multi-terrace systems and their different communities, and their special features, such as the niche of Black Maple and Sycamore.

- **Species Recovery**; when and as necessary and appropriate, based on the requirements of individual reintroduction projects.

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APPENDIX A: VASCULAR PLANTS OF THE ROUGE VALLEY PARK

A total of 762 species (783 taxa) have been recorded in the study area, with an additional 31 species persisting as plantings, but not spreading. The 544 native taxa constitute 28% of Ontario's native flora (Morton and Venn 1990). 239 taxa or 30% of the Rouge Park flora have been introduced, and are so noted with the symbol "+" along the left margin. Species of doubtful origin are noted by the symbol "(+)". The botanical names follow Riley (1989).

Voucher specimens and sight records (SR) are based on the following sources: JLR - John L. Riley, SV - Steve Varga, JK - Jeff Kaiser, PC - Peter Copeland, MO - Mike J. Oldham, DC - David Cunningham, RWJ - Robert W. Jackson, PMC - Dr. P.M. Catling, KL - Kathy Lindsay, JEE - Dr. J.E. Eckenwalder, GW - G. Wells, DH - Dale Hoy, KM - Karen L. McIntosh, SM - Sheila M. McKay, GA - Gary Allen, MW - M. Wilkes, JR - Jim Robb, DK - Daphne Kaye, CSWD - City of Scarborough (1983), LTO - L.T. Owens, GC - G. Cunningham, FR - F. Remiz, RD - R. Dowher. Taxa based on voucher specimens are annotated with the following herbarium acronyms: Royal Ontario Museum (TRT), and the Metropolitan Toronto Parks Department (MP). This checklist supercedes earlier lists of plants for the Rouge (Riley 1978, Riley *et al.* 1981), and all voucher specimens have been reexamined and, where appropriate, redetermined.

Seven additional species occur in the Park's Phase 2 Study Area (Kamstra 1991). Thirteen species listed in "An Assessment of Natural Areas in Scarborough" (City of Scarborough 1983) need confirmation. Many are rare species which are not substantiated by vouchers, and appear to be doubtful for the study area.

Species	**Common Name**	**Community Type**	**Source**
LYCOPODIACEAE	CLUBMOSS FAMILY		
Lycopodium dendroideum Michx. (*L. obscurum* L. var. *dendroideum* (Michx.) D.C. Eat. *ex* A. Gray)	Round-branched Ground-pine	19	JLR (TRT 75)
Lycopodium digitatum A.Br. (*L. complanatum* L. var. *flabelliforme* Fern.)	Crowfoot Clubmoss	19	JLR (TRT 79)
Lycopodium lucidulun Michx.	Shining Clubmoss	17,19,25	SV & JLR (TRT 79) SV (TRT 79)
EQUISETACEAE	HORSETAIL FAMILY		
Equisetum arvense L.	Field Horsetail	3-14,17,19,20, 23-37	JLR (TRT 73,75) JK & PC (MP 74) DC (TRT 80)
Equisetum fluviatile L.	Water Horsetail	2-4	JLR (TRT 73)
Equisetum hyemale L. var. *affine* (Engelm.) A.A. Eat.	Scouring-rush	5-13,16,17,23, 27-37	JLR (TRT 75) JK & PC (MP 74) SV (TRT 84)

Species	Common Name	Community Type	Source
Equisetum scirpoides Michx.	Dwarf Scouring-rush	8-10,15,19,23	JLR (TRT 75) SV (TRT 79)
Equisetum variegatum Schleich.	Variegated Scouring-rush	5b,c,11,28c, 29a,32	JLR (TRT 75) JK & PC (MP 74) SV (TRT 88) LTO (TRT 47)
Equisetum X*nelsonii* (A.A.Eat.) Schaffn.	(*E. laevigatum* X *E. variegatum*)	28c	SV & JLR (TRT 79)
OPHIOGLOSSACEAE	ADDER'S-TONGUE FAMILY		
Botrychium virginianum (L.) Sw.	Rattlesnake Fern	12-13,16,17,19, 23,25	JLR, DH (TRT 76)
OSMUNDACEAE	ROYAL FERN FAMILY		
Osmunda cinnamomea L.	Cinnamon Fern	10	SV (TRT 90)
Osmunda claytoniana L.	Interrupted Fern	16	JK & PC (MP 74)
DENNSTAEDTIACEAE	BRACKEN FAMILY		
Pteridium aquilinum (L.) Kuhn var. *latiusculum* (Desv.) Underw.	Eastern Bracken	15-24,26,29-37	JLR (TRT 73) JK & PC (MP 74)
ADIANTACEAE	MAIDENHAIR FERN FAMILY		
Adiantum pedatum L.	Northern Maidenhair Fern	17-19,23,25	JLR (TRT 75) SV (TRT 79) JK & PC (MP 74)
ASPLENIACEAE	SPLEENWORT FAMILY		
Athyrium filix-femina (L.) Roth var. *michauxii* (Spreng.) Fern. (*A. angustum* (Willd.) Presl. var. *angustum*)	Northeastern Lady Fern	5,7-10,12-14, 16,17,19,23,25, 26,32,33	JK & PC (MP 74) SV (TRT 79,83)
Athyrium thelypterioides (Michx.) Desv.	Silvery Glade Fern	5,7,17,23	SV (TRT 79,83,84)
Cystopteris bulbifera (L.) Bernh.	Bulblet Fern	5,7-10,12-14, 17,19,20,23,25, 26,32,33	JLR (TRT 73) JK & PC (MP 74)
Cystopteris tenuis (Michx.) Desv. (*C. fragilis* (L.) Bernh. var. *mackayi* Lawson)	Mackay's Fragile Fern	19	PC (TRT 74) SV & JLR (TRT 79) SV (TRT 80) MO (TRT 80) SV (TRT 83)

Species	Common Name	Community Type	Source
Dryopteris carthusiana (Vill.) H.P. Fuchs (*D. spinulosa* (O.F. Muell.) Watt; *D. austriaca* (Jacq.) Woynar var. *spinulosa* (O.F. Muell.) Fiori)	Spinulose Wood Fern	5-20,22-26,32-37	JK & PC (MP 74 SV (TRT 90) SV (TRT 80) SV & KL (TRT 79)
Dryopteris clintoniana (D.C. Eat.) Dowell (*D. cristata* (L.) Gray var. *clintoniana* (D.C. Eat.) Underw.)	Clinton's Wood Fern	5,8,10	SV (SR 90)
Dryopteris cristata (L.) Gray	Crested Wood Fern	5,8,10	SV (TRT 90)
Dryopteris goldiana (Hook.) Gray	Goldie's Fern	17,23	SV (TRT 79,83)
Dryopteris intermedia (Willd.) Gray (*D. spinulosa* (O.F. Muell.) Watt. var. *intermedia* (Willd.) Underw.) (*D. austriaca* (Jacq.) Woynar var. *intermedia* (Willd.) Mort.)	Glandular Wood Fern	5-10,12-20,22-26,32-37	JLR (TRT 73,75) SV (TRT 79,83) JK & PC (MP 74)
Dryopteris marginalis (L.) Gray	Marginal Wood Fern	13,16-20,23-26, 32-33	JLR (TRT 73,75) SV (TRT 75) SV (TRT 79) SV & JLR (TRT 79) JK & PC (MP 74)
Gymnocarpium dryopteris (L.) Newm. (*Dryopteris disjuncta* (Ledeb.) Mort.)	Oak Fern	8,19,25	SV (TRT 79)
Matteuccia struthiopteris (L.) Todaro var. *pensylvanica* (Willd.) Mort. (*Pteretis pensylvanica* (Willd.) Fern.)	American Ostrich Fern	5-10,12-14,17, 19,20,23-25, 32-35,37	JLR (TRT 73) SV (TRT 79) JK & PC (MP 74)
Onoclea sensibilis L.	Sensitive Fern	5-7,12,23,26, 29,32,33	JLR (TRT 73) JK & PC (MP 74)
Polystichum acrostichoides (Michx.) Schott	Christmas Fern	16-19,23-25	JLR (TRT 73,75) JK & PC (MP 74)

	Species	Common Name	Community Type	Source
	THELYPTERIDACEAE	BEECH FERN FAMILY		
	Thelypteris palustris (Salisb.) Schott var. *pubescens* (Lawson) Fern. (*Dryopteris thelypteris* (L.) Gray var. *pubescens* (Lawson) Nakai)	Marsh Fern	5,7	SV (TRT 90)
	POLYPODIACEAE	POLYPODY FAMILY		
	Polypodium virginianum L. (*P. vulgare* L. var. *virginianum* (L.) A.A.Eat.)	Rock Polypody	18,19	JLR (TRT 75) SV (TRT 79)
	TAXACEAE	YEW FAMILY		
	Taxus canadensis Marsh.	American Yew	10,13,16,17,19, 23,25,33	JLR (TRT 73,75) JK & PC (MP 74)
	PINACEAE	PINE FAMILY		
	Abies balsamea (L.)Mill.	Balsam Fir	7,8,19,32	SV (SR 90)
+	*Picea abies* (L.) Karst.	Norway Spruce	8,30,35-37	JLR (TRT 75) SV (TRT 90)
+	*Picea glauca* (Moench) Voss	White Spruce	19,30,35,37	JK & PC (MP 74)
	Pinus resinosa Ait.	Red Pine	21,37	JLR (TRT 75)
	Pinus strobus L.	White Pine	5,7,8,14-26,30-33,35,37	JLR (TRT 73)
+	*Pinus sylvestris* L.	Scots Pine	30,35-37	JK & PC (MP 74)
	Tsuga canadensis (L.) Carr.	Eastern Hemlock	5,7-10,12-26, 32-33	JLR (TRT 73) JK & PC (MP 74)
	CUPRESSACEAE	CYPRESS FAMILY		
	Juniperis virginiana L.	Red Cedar	30	JLR (TRT 75) JK & PC (MP 74)
	Thuja occidentalis L.	White Cedar	6-10,12-26,29-34	JLR (TRT 73) JK & PC (MP 74)
	TYPHACEAE	CATTAIL FAMILY		
	Typha angustifolia L.	Narrow-leaved Cattail	3-6	JK & PC (TRT 74)
	Typha latifolia L.	Common Cattail	3-6	JK & PC (TRT 74)
	Typha X*glauca* Godr. (*T. latifolia* X*T. angustifolia*)	Hybrid Cattail	3	SV (SR 90)
	SPARGANIACEAE	BUR-REED FAMILY		
	Sparganium chlorocarpum Rydb.	Green-fruited Bur-reed	2	SV (TRT 80)

	Species	Common Name	Community Type	Source
	Sparganium eurycarpum Engelm.	Giant Bur-reed	3,4	JLR (TRT 73) JK & PC (MP 74)
	ZOSTERACEAE	PONDWEED FAMILY		
+	*Potamogeton crispus* L.	Curly-leaved Pondweed	2	JKR (TRT 73)
	Potamogeton pectinatus L.	Sago Pondweed	2	JLR (TRT 73,75) SV (TRT 88)
	Potamogeton pusillus L. var. *pusillus* var. *tenuissimus* Mert. & Koch (*P. berchtoldii* Fieber)	Small Pondweed	2	JLR (TRT 73,75) SV (TRT 88)
	Potamogeton zosteriformis Fern.	Flat-stemmed Pondweed	2	JLR (TRT 73) SV (TRT 88)
	NAJADACEAE	NAIAD FAMILY		
	Najas flexilis (Willd.) R. & S.	Bushy Naiad	2	JLR (TRT 73) SV (TRT 88)
	ALISMATACEAE	WATER-PLANTAIN FAMILY		
	Alisma plantago-aquatica L. (incl. *A. triviale* Pursh and *A. subcordatum* Raf.)	Water-plantain	2-4	JLR (TRT 73) JK & PC (MP 74)
	Sagittaria cuneata Sheldon	Arrowhead	2-4	JLR (TRT 73) SV (TRT 80,88)
	Sagittaria latifolia Willd.	Common Arrowhead	2-4	SV (TRT 79) JK & PC (MP 74)
	HYDROCHARITACEAE	FROG'S-BIT FAMILY		
+	*Hydrocharis morus-ranae* L.	Frog's-bit	2	SV (TRT 91)
	Elodea canadensis Michx. (*Anacharis canadensis* (Michx.) Richards.)	Water-weed	2	JLR (TRT 73) SV (TRT 88)
	Vallisneria americana Michx.	Tape Grass	2	JLR (TRT 73) SV (TRT 88)
	POACEAE	GRASS FAMILY		
+	*Agropyron repens* (L.) Beauv.	Quack Grass	6,11,12,27,29-33	JLR (TRT 73) PC (TRT 74)
	Agropyron trachycaulum (Link) Malte *ex* H. F. Lewis	Slender Wheat Grass	16,22	SV (TRT 89)
+	*Agrostis gigantea* Roth. (*A. alba auct. amer., non* L.)	Redtop	5-12,27-33	PC (TRT 74)

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	Species	Common Name	Community Type	Source
	Agrostis perennans (Walt.) Tuckerm.	Autumn or Upland Bent Grass	15-19,21-25	SV & KL (TRT 79) SV (TRT 79,88)
(+)	*Agrostis stolonifera* L. (*A. alba* L. var. *palustris* (Huds.) Pers.)	Creeping Bent Grass	5-7,11,27,30	JLR (TRT 73)
	Alopecurus aequalis Sobol	Short-awned Foxtail	5,28	JLR (TRT 75) SV (TRT 88)
	Andropogon gerardii Vitm.	Big Bluestem	30c	JLR (TRT 75)
+	*Avena sativa* L.	Oats	30d	PC (TRT 74)
	Brachyelytrum erectum (Roth) Beauv.	Bearded Shorthusk	17,22	SV (TRT 89)
	Bromus ciliatus L. (incl. *B. dudleyi* Fern.)	Fringed Brome Grass	5,8,10,12,15, 27,32	PC (TRT 74) JLR (TRT 73)
+	*Bromus commutatus* Schrad.	Hairy Chess	30d	JK & PC (MP 74)
+	*Bromus hordaceus* L. (*B. mollis* L.)	Soft Chess	30	PC (TRT 74)
+	*Bromus inermis* Leyss.	Smooth Brome Grass	5,11,12,27-37	JLR (TRT 73,75) JK (TRT 74) PC (TRT 74)
	Bromus latiglumis (Shear) A.S. Hitchc.	Tall Brome Grass	12,13,16,21	JLR (TRT 73) SV (TRT 88)
	Bromus pubescens Willd.	Canada Brome	13,15-17,19,21, 22	SV (TRT 84,89)
	Calamagrostis canadensis (Michx.) Beauv.	Canada Blue-joint	3-11,27-30	JLR (TRT 73)
	Cinna latifolia (Goepp.) Griseb.	Nodding Wood Grass	8-10,13,19	SV (TRT 79)
+	*Dactylis glomerata* L.	Orchard Grass	5,11,27-37	JLR (TRT 73) PC (TRT 74) JK & PC (MP 74)
	Danthonia spicata (L.) R.&S.	Poverty Oat Grass	5,15,16,21,22, 30-32	JLR & PC (TRT 77) SV (TRT 80,84)
+	*Digitaria ischaemum* (Schreb.) Schreb. *ex* Muhl.	Smooth Crabgrass	30	JLR (TRT 73)
+	*Digitaria sanguinalis* (L.) Scop.	Large Crabgrass	30	SV (TRT 90)
+	*Echinochloa crusgalli* (L.) Beauv.	Barnyard Grass	5,11,27,28,30	JLR (TRT 73) SV & JLR (TRT 79) SV (TRT 90)

	Species	**Common Name**	**Community Type**	**Source**
	Echinochloa weigandii (Fassett) McNeill & Dore (*E. pungens* (Poir.) Rydb. var. *weigandii* Fassett) (*E. occidentalis* (Wieg.) Rydb.)	Western Barnyard Grass	30	SV (TRT 90)
	Elymus canadensis L.	Canada Wild-rye	28	JLR (TRT 73,74)
	Elymus hystrix L.	Bottle-brush Grass	16,17,21-23,31	JLR (TRT 73) JK (TRT 74)
	Elymus riparius Weig.	River Bank Wild-rye	5,11-13,18,21, 24,25	JLR (TRT 73) SV (TRT 79)
	Elymus virginicus L.	Virginia Wild-rye	7,11-13,15,19, 27	PC (TRT 74) JLR (TRT 73,74) SV & KL (TRT 79) SV (TRT 84)
+	*Eragrostis poaeoides* R.&S. (*E. minor* Host)	Little Love Grass	28,29,30	SV (TRT 90)
	Festuca obtusa Biehl.	Nodding Fescue	12,13,15-19, 21-25,32	PC (TRT 74) SV & KL (TRT 79) SV (TRT 79)
+	*Festuca pratensis* Huds. (*F. elatior* L. *pro parte*)	Meadow Fescue	28,29,30	JLR (TRT 73,75) PC (TRT 74)
(+)	*Festuca rubra* L.	Red Fescue	5,30	JLR (TRT 73) PC (TRT 74) SV (TRT 88,89)
	Glyceria grandis S. Wats.	Tall Manna Grass	4-8,10	PC (TRT 74) JK (TRT 74)
	Glyceria septentrionalis A.S. Hitchc.	Eastern Manna Grass	5	SV (TRT 90)
	Glyceria striata (Lam.) A.S. Hitchc.	Fowl Manna Grass	4-13,17,23,29a, 32	SV (TRT 79)
+	*Hordeum jubatum* L.	Foxtail Barley	28-30	PC (TRT 74) JK (TRT 74)
	Leersia oryzoides (L.) Sw.	Cut Grass	5-13,27	JLR (TRT 75)
	Leersia virginica Willd.	White Grass	12-13,21,24	SV (TRT 88)
+	*Lolium multiflorum* Lam.	Italian Rye-grass	30	JK & PC (MP 74)
	Lolium perenne L.	Perennial Rye-grass	30	PC (TRT 74) JK & PC (MP 74)
	Milium effusum L.	Wood Millet	17,19,21,23	SV (TRT 84)

	Species	Common Name	Community Type	Source
	Muhlenbergia frondosa (Poir.) Fern.	Wire-stemmed Muhly Grass	16	SV (TRT 89)
	Muhlenbergia mexicana (L.) Trin. var. *filiformis* (Willd.) Scribn. var. *mexicana*	Muhly Grass	3,12,16,21	SV (TRT 90) SV & GA (TRT 88) JLR (TRT 75) SV (TRT 89)
	Oryzopsis asperifolia Michx.	Rough-leaved Mountain-rice	15,16,18,19, 21,22,24,32,33	JLR (TRT 75) JK (TRT 74) SV (TRT 79,80)
	Oryzopsis racemosa (Sm.) Hitchc.	Mountain-rice	13,15-17,19,23	JLR & DH (TRT 76) SV (TRT 79,84)
	Panicum capillare L.	Witch Grass	11,27-31	JLR (TRT 73)
	Panicum columbianum Scribner (*Dichanthelium sabulorum* (Lam.) Gould & Clark)	Panic Grass	16,21,32	SV (TRT 84,89)
+	*Panicum dichotomiflorum* Michx.	Fall Panic Grass	30	SV (TRT 90)
	Panicum lanuginosum Ell. var. *implicatum* (Scribn.) Fern.	Panic Grass	5,27-30	PC (TRT 74) JLR (TRT 75) SV (TRT 89)
	Panicum latifolium L. (*Dichanthelium l.* (L.) Gould & Clark)	Broadleaf Panic Grass	15,16,19,21,22, 32	SV (TRT 79)
	Panicum linearifolium Britt. (*Dichanthelium l.* (Scribn.) Gould)	Narrow-leaved Panic Grass	16,30,32	SV & PMC (TRT 80) SV (TRT 89)
	Panicum xanthophysum A. Gray (*Dichanthelium x.* (A. Gray) Freckm.)	Panic Grass	16,21	SV (TRT 89)
	Phalaris arundinacea L.	Reed Canary Grass	4-7,11-13,27-32	JLR (TRT 73) PC (TRT 74) JK & PC (MP 74)
+	*Phleum pratense* L.	Timothy	11,27,29-34,36	JLR (TRT 73) PC (TRT 74)
	Poa alsodes L.	Woodland Poa	12,17,23	SV (TRT 83)
+	*Poa annua* L.	Annual Blue Grass	27,30	JLR (TRT 76)
(+)	*Poa compressa* L.	Canada Blue Grass	11,12,15,16, 20-22,26-37	PC (TRT 74) JLR (TRT 73)
+	*Poa nemoralis* L.	Wood Blue Grass	12,17,21,23	SV (TRT 84)
	Poa palustris L.	Fowl Manna Grass	4-12,27	JLR (TRT 73) PC (TRT 74)

	Species	Common Name	Community Type	Source
+	*Poa pratensis* L.	Kentucky Blue Grass	5-7,11,12,23, 27-37	JLR (TRT 73) PC (TRT 74) SV (TRT 79)
+	*Poa trivialis* L.	Rough Blue Grass	17	JLR (TRT 73)
+	*Puccinellia distans* (Jacq.) Parl.	Alkali Grass	30d	PC (TRT 74) JLR & KL (TRT 79)
	Schizachne purpurascens (Torr.) Sw.	False Melic Grass	16-17,22-23	SV (TRT 90)
+	*Setaria faberi* W. Herrmann	Nodding Foxtail	3	SV (TRT 88)
+	*Setaria glauca* (L.) Beauv.	Yellow Foxtail	30	PC (TRT 74) SV (TRT 90)
+	*Setaria viridis* (L.) Beauv.	Green Foxtail	30	JLR (TRT 73) SV (TRT 90)
	Sphenopholis intermedia (Rydb.) Rydb.	Slender Wedge Grass	5,15,21,31	SV (TRT 84,88,89)
	Sporobolus cryptandrus (Torr.) Gray	Sand Dropseed	28a,b;30	SV (TRT 79)
	Sporobolus neglectus Nash	Overlooked Dropseed	30d	SV (TRT 79)
	Sporobolus vaginiflorus (Torr.) Wood var. *inaequalis* Fern.	Ensheathed Dropseed	30	SV (TRT 90)
+	*Triticum Xaestivum* L.	Wheat	30	PC (TRT 74) JK & PC (MP 74)
	Zizania palustris L.	Northern Wild-rice	2	SV (TRT 80) MW (TRT 1900)
	CYPERACEAE	SEDGE FAMILY		
	Carex albursina Sheld. (*C. laxiflora* Lam. var. *latifolia* Boott)	Sedge	17,23	SV (TRT 83)
	Carex alopecoidea Tuckerm.	Sedge	30	JK (TRT 74)
	Carex amphibola Steud. var. *turgida* Fern.	Sedge	12,13,23	SV (TRT 90)
	Carex arctata Boott	Sedge	16-19,22-25, 32,33	SV (TRT 79,83) JK & PC (MP 74) SV & JLR (TRT 79)
	Carex aurea Nutt.	Sedge	5c,29a	PC (TRT 74) JLR (TRT 73,75) SV (TRT 83)
	Carex bebbii (Bailey) Fern.	Sedge	5,11,12,27,30	JLR (TRT 73) SV (TRT 89,90)

Species	Common Name	Community Type	Source
Carex blanda Dew. (*C. laxiflora* Lam. var. *blanda* (Dew.) Boott)	Sedge	7,8,10,12,13, 15-19,22-25, 32,33	JLR (TRT 73,75) JLR & DH (TRT 76) JK & PC (MP 74) SV (TRT 80,83,90) DC (TRT 80) GW (TRT 80) MO (TRT 80)
Carex cephaloidea (Dew.) Dew.	Sedge	22,23,32	PC (TRT 74) SV (TRT 88,90)
Carex cephalophora Muhl. *ex* Willd.	Sedge	16,18,21-23,32	JK & PC (MP 74) SV (TRT 88,89)
Carex communis Bailey	Sedge	16-19,22,23	PC (TRT 74) JK (TRT 74) JLR (TRT 75) SV (TRT 80)
Carex convoluta Mack. (incl. in *C. rosea* Schk. ex Willd.)	Sedge	13,15-19,21-25	SV & JLR (TRT 79) JLR (TRT 73,76) SV (TRT 79,83,89) SV & KL (TRT 79) JK & PC (MP 74)
Carex cristatella Britt.	Sedge	4-5,11,12,19, 27,30	SV (TRT 88,89,90)
Carex deweyana Schw.	Sedge	15-25,32,33	SV (TRT 79)
Carex digitalis Willd.	Sedge	16	SV (TRT 89)
Carex disperma Dew.	Sedge	8	SV (SR 89)
Carex eburnea Boott	Sedge	8,18,19,33	JLR (TRT 73,75) JK (TRT 74) PC (TRT 74) SV (TRT 80) JK & PC (MP 74)
Carex flava L.	Sedge	5	SV (TRT 88)
Carex foenea Willd.	Sedge	21	SV (TRT 89)
Carex gracillima Schw.	Sedge	7,23,32	SV (SR 90) MO (TRT 80, xerox)
Carex granularis Muhl. *ex* Willd.	Sedge	5,28,30	JK (TRT 74) PC (TRT 74)
Carex hirtifolia Mack.	Sedge	7,12,23	SV (TRT 84,88,90)
Carex hitchcockiana Dewey	Sedge	7,17,23,25,32	SV (TRT 83)
Carex hystericina Muhl. *ex* Willd.	Sedge	3-8,10,28c	JLR (TRT 75) SV (TRT 89,90)

Species	Common Name	Community Type	Source
Carex interior Bailey	Sedge	5,10	SV (TRT 89,90)
Carex intumescens Rudge	Sedge	7,22,23	JLR & DH (TRT 76) SV (TRT 84)
Carex lacustris Willd.	Sedge	3-7	JLR (TRT 73) JK & PC (MP 74) MO (TRT 80)
Carex laevivaginata (Kukenth.) Mack.	Sedge	4,5,10	SV (TRT 88,90)
Carex lanuginosa Michx.	Sedge	4,5,28c	PC (TRT 74) JLR (TRT 73) JK & PC (MP 74)
Carex laxiflora Lam.	Sedge	16,21,23	SV (TRT 84,89)
Carex lupulina Muhl. *ex* Willd.	Sedge	5,7	SV (TRT 90)
Carex muhlenbergii Schk. *ex* Willd.	Sedge	30	SV (TRT 89)
Carex peckii Howe	Sedge	16,17,19,22,23, 32	SV & JLR (TRT 80) SV (TRT 80) PC (TRT 74) MO (TRT 80)
Carex pedunculata Muhl. *ex* Willd.	Sedge	12,13,16-19,23, 25,32-33	PC (TRT 74) JLR (TRT 75) SV (TRT 79,80) JK & PC (MP 74)
Carex pensylvanica Lam.	Sedge	15-19,21,22,29, 32	SV & JLR (TRT 79) JLR (TRT 75) SV (TRT 80) SV & KL (TRT 79) JK & PC (MP 74)
Carex plantaginea Lam.	Sedge	17,23	JK & PC (MP 74) SV (TRT 79)
Carex platyphylla Carey	Sedge	16-19,23	JLR (TRT 75) SV & JLR (TRT 79) SV (TRT 79) JK & PC (MP 74) SV (TRT 83)
+ *Carex praegracilis* Boott	Sedge	30d	SV & PMC (TRT 80)
Carex pseudocyperus L.	Sedge	3-8,10,27	JLR (TRT 73) SV (TRT 89) DC (TRT 80)
Carex retrorsa Schw.	Sedge	5	JLR & DH (TRT 76) SV (TRT 88,90)

Species	Common Name	Community Type	Source
Carex rosea Schk. *ex* Willd.	Sedge	7,8,10,23,32,34	JLR & SV (TRT 80) SV (TRT 83,84,88)
Carex rugosperma Mack.	Sedge	30	SV (SR 89)
Carex scabrata Schw.	Sedge	8,10	SV (TRT 83,84)
Carex sparganioides Muhl. *ex* Willd.	Sedge	16,17,19,22,23	PC (TRT 74) JLR (TRT 73) SV (TRT 79,83)
+ *Carex spicata* Huds.	Sedge	21,22,30	PC (TRT 74) SV (TRT 84,89,90) MO (TRT 80)
Carex sprengelii Dewey *ex* Spreng.	Sedge	7,23,32	SV (SR 90)
Carex stipata Muhl. *ex* Willd.	Sedge	4-8,10	PC (TRT 74) JK & PC (MP 74)
Carex stricta Lam.	Sedge	3-7	JLR (TRT 73) JK & PC (MP 74)
Carex tenera Dewey	Sedge	19,30,32	MO (TRT 80) SV (TRT 84,89,90)
Carex tuckermanii Boott *ex* Dewey	Sedge	7	SV (TRT 90)
Carex utriculata Boott (*C. rostrata* of authors)	Sedge	3-5	JLR (TRT 73)
Carex viridula Michx.	Sedge	5	SV (TRT 90)
Carex vulpinoidea Michx. (incl. *C. annectans* (Bickn.) Bickn.)	Sedge	5-8,10,11,27-30	JK (TRT 74) PC (TRT 74) JLR (TRT 73) SV (TRT 83,89)
Carex woodii Dewey (*C. tetanica* Schk. var. *woodii* (Dewey) Bailey)	Sedge	22a	SV (TRT 88)
Cyperus engelmannii Steud.	Nut Grass	28	JLR (TRT 75) SV & GA (TRT 88)
Cyperus lupulinus (Spreng.) Marcks. (part of *C. filiculmis* Vahl)	Nut Grass	30	JLR (TRT 75) SV (TRT 89)
Cyperus odoratus L. var. *squarrosus* (Britt.) Gilly (*C. ferruginescens* Boeckl.)	Nut Grass	28	JLR (TRT 73,75) SV & GA (TRT 88)
Cyperus strigosus L.	Nut Grass	30	SV (TRT 90)
Eleocharis acicularis (L.) R.&S.	Spike-rush	28d	SV & GA (TRT 88)

Species	**Common Name**	**Community Type**	**Source**
Eleocharis erythropoda Steud. (*E. calva* Torr.)	Spike-rush	4,5,27,28	JLR (TRT 73,75) JK & PC (MP 74) SV (TRT 88)
Eleocharis intermedia Schultes	Spike-rush	28d	SV & GA (TRT 88)
Eleocharis obtusa (Willd.) Schultes	Spike-rush	30	SV (TRT 90)
Scirpus acutus Muhl.	Hard-stemmed Bulrush	3-5,27	JLR (TRT 73)
Scirpus atrovirens Willd.	Black Bulrush	3-7,27,30	JLR (TRT 73) JK & PC (MP 74) SV (TRT 84)
Scirpus cyperinus (L.) Kunth var. *cyperinus*	Wool-grass	3-7,27	JLR & DH (TRT 76)
Scirpus fluviatilis (Torr.) Gray	River Bulrush	3,4a	JLR (TRT 73) JK & PC (MP 74)
Scirpus pendulus Muhl. (*S. lineatus* Michx.)		30	SV (TRT 90)
Scirpus rubrotinctus Fern. (*S. microcarpus* Presl. var. *rubrotinctus* (Fern.) M.E. Jones)		3-5	JLR (TRT 73) JK & PC (MP 74)
Scirpus validus Vahl	Softstem Bulrush	3-5,27	JLR (TRT 73) JK & PC (MP 74) SV (TRT 90) MO (TRT 80)
Scirpus verecundus Fern.	Shy Bulrush	15,30c	JLR & DH (TRT 76)
ARACEAE	ARUM FAMILY		
Acorus calamus L. (*A. americanus* (Raf.)Raf.)	Sweet Flag	3,4a	SV (TRT 90)
Arisaema triphyllum (L.) Schott	Jack-in-the-pulpit	7-10,12-14,16, 17,19,20,22,23-26,32-34	JLR (TRT 73) SV (TRT 80) JK & PC (MP 74)
Calla palustris L.	Water-arum (Wild Calla)	5,6	JLR (TRT 73) JK & PC (MP 74)
Symplocarpus foetidus (L.) Nutt.	Skunk Cabbage	6c	FR & RD (TRT 80, xerox)
LEMNACEAE	DUCKWEED FAMILY		
Lemna minor L.	Common Duckweed	1c,2-5,7	JLR (TRT 73)
Lemna trisulca L.	Star Duckweed	2,3	JLR (TRT 73)
Spirodela polyrhiza (L.) Schleid.	Greater Duckweed	2,3	JLR (TRT 73)

Species	Common Name	Community Type	Source
Wolffia borealis (Engelm.) Landolt (*W. punctata* Griseb.)	Water-meal	2,3	JLR (TRT 73)
Wolffia columbiana Karst.	Water-meal	2,3	JLR (TRT 73)
PONTEDERIACEAE	PICKERELWEED FAMILY		
Heteranthera dubia (Jacq.) MacM. (*Zosterella dubia* (Jacq.) Sm.)	Water Star-grass	2	SV (TRT 88)
JUNCACEAE	RUSH FAMILY		
Juncus alpinoarticulatus Chaix *in* Vill. (*Juncus alpinus* Villars)	Rush	5	SV (TRT 88)
Juncus articulatus L.	Rush	4,5,27,28	JLR (TRT 73) JK & PC (MP 74) SV (TRT 88)
Juncus balticus Willd.	Rush	5,28	PC (TRT 74) JLR (TRT 73) JK & PC (MP 74)
Juncus bufonius L.	Toad Rush	5,28,30d	PC (TRT 74) JLR (TRT 73) JK & PC (MP 74) SV & GA (TRT 88) SV (TRT 89)
+ *Juncus compressus* Jacq.	Rush	30d	JLR (TRT 73)
Juncus dudleyi Wieg.	Rush	5,28,29a	JLR (TRT 73) JK & PC (MP 74)
Juncus effusus L. ssp. *solutus* (Fern. & Wieg.) Hamet-Ahti (*J. effusus* L. var. *solutus* Fern. & Wieg.) (*J. griscomii* Fern.)	Rush	3-7	JLR (TRT 73)
Juncus nodosus L.	Rush	4,5,27,28	JLR (TRT 73) JLR (TRT 75) SV (TRT 88)
Juncus tenuis Willd.	Path Rush	21,22	SV (TRT 84)
Juncus torreyi Cov.	Rush	5,27,28,30d	JLR (TRT 73) SV (TRT 88)
Luzula acuminata Raf.	Wood Rush	15,21,22	JLR & DH (TRT 76) SV & KL (TRT 79)

	Species	Common Name	Community Type	Source
	Luzula multiflora (Retz.) Lej. (*L. campestris* (L.) DC. var. *multiflora* (Ehrh.) Celak.)	Wood Rush	16,32	JLR (TRT 76) JK & PC (MP 74) SV (TRT 88)
	LILIACEAE	LILY FAMILY		
	Allium tricoccum Ait.	Wild Leek, Ramps	7,12,13,17,23, 32	SV (TRT 79,80)
+	*Asparagus officinalis* L.	Garden Asparagus	29-32	JLR (TRT 73) JK & PC (MP 74)
	Clintonia borealis (Ait.) Raf.	Bluebead-lily	8,19	JLR (TRT 73)
+	*Convallaria majalis* L.	Lily-of-the-valley	12,30,33	JLR (TRT 73) JK & PC (MP 74)
	Erythronium americanum Ker	Yellow Trout-lily	7,12-26,30-37	JLR (TRT 75) SV (TRT 80) JK & PC (MP 74)
+	*Hemerocallis fulva* (L.) L.	Orange Day-lily	30,32,33	JLR (TRT 73) JK & PC (MP 74)
+	*Hemerocallis lilio-asphodelus* L. (*H. flava* L.)	Yellow Day-lily	30	JK & PC (MP 74)
	Lilium michiganense Farw. (*L. canadense* L. var. *umbelliferum* (Farw.) Boivin)	Canada Lily	5,7	JK & PC (MP 74)
	Maianthemum canadense Desf.	Wild Lily-of-the-valley		
	var *canadense*		7,8,10,12-26, 30-37	SV (TRT 79,80) JLR (TRT 73)
	var *interius*		15,21,22	JK & PC (MP 74) SV (TRT 79)
	Medeola virginiana L.	Indian Cucumber-root	19	SV (TRT 79)
+	*Muscari botryoides* (L.) Mill.	Grape Hyacinth	30	JLR (SR 73) JK & PC (SR 74)
+	*Ornithogalum umbellatum* L.	Star-of-Bethlehem	30	JK & PC (MP 74)
	Polygonatum pubescens (Willd.) Pursh	Solomon's-seal	12,13,15-26, 31-37	JLR (TRT 73,75) JK & PC (MP 74)
	Smilacina racemosa (L.) Desf.	False Solomon's-seal	7,12-26,31-37	JLR (TRT 73) SV & KL (TRT 79) JK & PC (MP 74)
	Smilacina stellata (L.) Desf.	False Solomon's-seal	7,12,13,15-19, 23,32,33	JLR (TRT 75) JLR (TRT 73) SV & KL (TRT 79) JK & PC (MP 74)

	Species	Common Name	Community Type	Source
	Smilax herbacea L.	Carrion-flower	12,13,15,16, 18,19,21-24	JLR (TRT 73) SV (TRT 79) JLR & DH (TRT 76) SV & KL (TRT 79) JK & PC (MP 74)
	Smilax hispida Torr. (*S. tamnoides* L. var. *hispida* (Torr.) Fern.)	Bristly Greenbrier	7,12,16,17,22	JLR (TRT 75) SV (TRT 79)
	Streptopus roseus Michx.	Rose Twisted Stalk	16,18,19,25	JLR (TRT 75) SV (TRT 80)
	Trillium erectum L.	Purple Trillium, Stinking	7,12-14,16-20, 23-26,32-37	JK & PC (MP 74) SV (TRT 80) RWJ (TRT 90)
	f. luteum			RWJ (TRT 90)
	Trillium grandiflorum (Michx.) Salisb.	Common Trillium	7,12-26,31-37	JLR (TRT 75) SV (TRT 80) JK & PC (MP 74) RWJ (TRT 90)
	Uvularia grandiflora Sm.	Bellwort	7,17,19,23	JLR (TRT 75) SV (TRT 79) JK & PC (MP 74)
	IRIDACEAE	IRIS FAMILY		
+	*Iris pseudacorus* L.	Yellow Flag	3-5	JLR (TRT 73) JK & PC (MP 74)
	Iris versicolor L.	Wild Blue Flag	3-7	JLR (TRT 73) JK & PC (MP 74)
	Sisyrinchium montanum Greene	Little Blue-eyed Grass	5,29,30	JLR (TRT 75) JK & PC (MP 74) SV (TRT 90)
	ORCHIDACEAE	ORCHID FAMILY		
	Cypripedium calceolus L.			
	var. *parviflorum* (Salisb.) Fern.	Small Yellow Lady-slipper	5,31	JK & PC (MP 74) SV (TRT 90)
	var. *pubescens* (Willd.) Corr.	Large Yellow Lady-slipper	15-19,32-33	JLR (TRT 75) SV (TRT 79)
+	*Epipactis helleborine* (L.) Crantz	Helleborine	12-26,32-37	JLR (TRT 73) JK & PC (MP 74)
	Galearis spectabilis (L.) Raf. (*Orchis spectabilis* L.)	Showy Orchis	23a	SV (TRT 84)
	Liparis loeselii (L.) Rich.	Loesel's Twayblade	5c	SV (TRT 80)

	Species	Common Name	Community Type	Source
	Spiranthes cernua (L.) Rich.	Nodding Ladies'-tresses	5c,30	JLR (SR 73) SV (SR 90)
	Spiranthes lucida (H.H. Eaton) Ames	Shining Ladies'-tresses	5c	JK & PC (TRT 74) PMC & SM (TRT 74) PMC & KM (TRT 75)
	SALICACEAE	WILLOW FAMILY		
+	*Populus alba* L.	White Poplar	12,13,30-32	SV (SR 89,90)
	Populus balsamifera L.	Balsam Poplar	5,7-14,19,20, 26,28-37	SV & JLR (TRT 80) JLR (TRT 73,75) JK & PC (MP 74)
	Populus deltoides Marsh.	Cottonwood	5,11-13,27,28, 30,32,33	JK & PC (MP 74) SV (TRT 90)
	Populus grandidentata Michx.	Large-toothed Aspen	7-26,28-37	SV (TRT 79) JLR & DH (TRT 76) JK & PC (MP 74)
	Populus tremuloides Michx.	Trembling Aspen	5,7-26,28-37	JLR (TRT 73,75) JK & PC (MP 74)
+	*Populus Xcanadensis* Moench	(*P. nigra* X *P. deltoides*)	12,30	JK & PC (MP 74) JLR (TRT 73)
	Salix alba L.			
+	var. *alba*	White Willow	7,11,12	SV (TRT 90)
+	var. *vitellina* (L.) Stokes X *S. babylonica* L.	Weeping Willow	30,32j,34	SV (TRT 90) JK & PC (MP 74)
	Salix amygdaloides Anderss.	Peach-leaved Willow	6,7,11-13,27	JLR (TRT 73)
	Salix bebbiana Sarg.	Beaked Willow, Bebb's Willow	4-8,10	JK & PC (MP 74) SV (TRT 90)
	Salix discolor Muhl.	Pussy Willow	5,6,15	JLR (TRT 75)
	Salix eriocephala Michx. (*S. rigida* Muhl.)	Heart-leaved Willow	4-8,11,12,27-33	JLR (TRT 73,75) JK & PC (MP 74) SV (TRT 88,89)
	Salix exigua Nutt. (*S. interior* Rowlee)	Sandbar Willow	5-7,11,12,27-28	JK (TRT 74) SV (TRT 84)
	Salix humilis Marsh.	Upland Willow	6	SV (TRT 88)
	Salix lucida Muhl.	Shining Willow	5	SV (TRT 88) JLR (TRT 75)
	Salix nigra L.	Black Willow	11,12	JLR (TRT 73)
+	*Salix pedicellaris* Pursh	Bog Willow	5h,6b	SV (TRT 88)
	Salix petiolaris Sm. (*S. gracilis* Anderss.)	Slender Willow	5,6	SV (SR 88,89)

	Species	Common Name	Community Type	Source
+	*Salix purpurea* L.	Purple Osier; Basket Willow	11	JLR (TRT 75)
+	*Salix Xrubens* Schrank	(*S. alba* X *S. fragilis*)	7,11-13,27,32-34,37	JLR (TRT 75) SV (TRT 89) JK & PC (MP 74)
	JUGLANDACEAE	WALNUT FAMILY		
	Carya cordiformis (Wang.) K. Koch	Bitternut Hickory	12-26,31-34,36	SV (TRT 79) JLR (TRT 75) JK & PC (MP 74)
	Juglans cinerea L.	Butternut	7,8,12-20,22-26,32-34,36	JLR & DH (TRT 76) JK & PC (MP 74)
	Juglans nigra L.	Black Walnut	12,13,30,36	JK & PC (MP 74) SV (TRT 90)
	BETULACEAE	BIRCH FAMILY		
+	*Alnus glutinosa* (L.) Gaertn.	Black Alder	12	JLR & SV (TRT 79)
	Alnus rugosa (Du Roi) Spreng.	Speckled Alder	6,7	JLR (TRT 73,75) JK & PC (MP 74)
	Betula alleghaniensis Britt. (*B. lutea auct.,non* Michx.)	Yellow Birch	5-10,12,13,16-19,22,23,32,33	JLR (TRT 73) JK & PC (MP 74)
	Betula papyrifera Marsh.	White Birch	5-10,12-26,29-37	JK & PC (TRT 74) JK & PC (MP 74)
	Carpinus caroliniana Walt.	Blue Beech	7-10,12-17,19,22,23,25,32-34	JLR (TRT 73) JK & PC (MP 74)
	Corylus cornuta Marsh.	Beaked Hazel	13,15-19,21-25,32,33	SV (TRT 79) JLR (TRT 75)
	Ostrya virginiana (Mill.) K. Koch	Ironwood	7-10,12-26,31-37	JLR (TRT 73) JK & PC (MP 74)
	FAGACEAE	BEECH FAMILY		
	Fagus grandifolia Ehrh.	American Beech	12-26,31-37	JLR (TRT 73) JK & PC (MP 74)
	Quercus alba L.	White Oak	15,16,18,21,22,24,32	JLR (TRT 73) JK & PC (MP 74)
	Quercus macrocarpa Michx.	Bur Oak	7,12,34	JK & PC (MP 74) SV (TRT 90)
	Quercus rubra L.	Red Oak	13,15-26,29-37	JLR (TRT 73) JK & PC (MP 74)
	ULMACEAE	ELM FAMILY		
	Ulmus americana L.	White Elm	5-14,16,17,19,20,23-26,29-37	JLR (TRT 73) JK & PC (MP 74)

	Species	**Common Name**	**Community Type**	**Source**
+	*Ulmus pumila* L.	Siberian Elm	30	JK & PC (MP 74)
	Ulmus rubra Muhl.	Red or Slippery Elm	17,23	JLR & DH (TRT 76)
	MORACEAE	MULBERRY FAMILY		
+	*Morus alba* L.	White Mulberry	30	JK & PC (MP 74)
	CANNABINACEAE	HEMP FAMILY		
+	*Cannabis sativa* L.	Marijuana	30	JLR & SV (TRT 79)
	URTICACEAE	NETTLE FAMILY		
	Boehmeria cylindrica (L.) Sw.	False Nettle	3,5-7,12,32	JK & PC (MP 74) JLR & SV (TRT 79)
	Laportea canadensis (L.) Wedd.	Wood Nettle	5,7-10,12,13, 17,23	JLR & SV (TRT 79) JLR (TRT 73) SV (TRT 79)
	Pilea fontana (Lunell) Rydb.	Clearweed	5,6,12	SV (TRT 88,90)
	Pilea pumila (L.) Gray	Clearweed	3-7,12	SV (TRT 88)
	Urtica dioica L. subsp. *gracilis* (Ait.) Seland. (*U. procera* Muhl.)	American Stinging Nettle	5,10-12,30,32	JLR (TRT 73,74) JK & PC (MP 74)
	SANTALACEAE	SANDALWOOD FAMILY		
	Comandra umbellata (L.) Nutt.	Bastard Toadflax	15,16,21,22	SV (TRT 79)
	ARISTOLOCHIACEAE	BIRTHWORT FAMILY		
	Asarum canadense L.	Wild Ginger	7,12-14,16-20, 23,25,32,33	JLR (TRT 75) SV (TRT 79) JK & PC (MP 74)
	POLYGONACEAE	BUCKWHEAT FAMILY		
+	*Fagopyrum esculentum* Moenchh (*F. sagittatum* Gilib.)	Buckwheat		CSWD (SR 83)
	Polygonum amphibium L. var. *stipulaceum* Coleman (*P. natans* Eat.)	Water Smartweed	2,3,4a	JLR (TRT 73) SV (TRT 80) JK & PC (MP 74)
	Polygonum aviculare L. (*s.l.*) (incl. *P. monspeliense* L.)	Prostrate Knotweed	27-32	JLR (TRT 73) JK & PC (MP 74)
+	*Polygonum convolvulus* L. (*Bilderdykia convolvulus* (L.) Dumort)	Wild Buckwheat	30	PC (TRT 74)

	Species	Common Name	Community Type	Source
+	*Polygonum cuspidatum* Sieb. & Zucc. (*Reynoutria japonica* Houtt.)	Japanese Knotweed	12,29e,30	JK & PC (MP 74) SV (TRT 90)
(+)	*Polygonum hydropiper* L.	Marshpepper Smartweed	30	SV (TRT 90)
	Polygonum lapathifolium L.	Willow-weed	5,11,12,27,28, 30	PC (TRT 74)
+	*Polygonum persicaria* L.	Lady's Thumb	5,11,27,28	JLR (TRT 73) JK & PC (MP 74)
	Polygonum punctatum Ell.	Smartweed	3	SV (TRT 88)
+	*Rumex acetosella* L.	Sheep Sorrel	30-32	JK & PC (MP 74)
+	*Rumex crispus* L.	Curly Dock	27-32	JLR (TRT 73,75) JK & PC (MP 74) SV (TRT 89)
+	*Rumex longifolius* DC. (*R. domesticus* Hartm.)		30d	SV (TRT 80)
+	*Rumex obtusifolius* L.	Bitter Dock	30	JLR (TRT 73) JK (TRT 74)
	Rumex orbiculatus Gray	Great Water Dock	3-5,10	SV (TRT 90)
	CHENOPODIACEAE	SPINACH FAMILY		
	Atriplex patula L.	Spearscale	3,30d	JLR & KL (TRT 79) SV & GA (TRT 88)
	Atriplex prostrata DC. (*Atriplex patula* L. var. *hastata* (L.) Gray)	Halberd-leaved Atriplex	28	JLR & SV (TRT 79)
+	*Chenopodium album* L.	Lamb's-quarters, Pigweed	30	JLR (TRT 73) JK & PC (MP 74)
	Chenopodium capitatum (L.) Aschers.	Strawberry-blite	30	JK & PC (MP 74)
+	*Chenopodium glaucum* L. var. *glaucum*	Oak-leaved Goosefoot	28a,b	JLR & SV (TRT 79) SV & GA (TRT 88)
+	*Kochia scoparia* (L.) Schrad.	Kochia, Summer Cypress	30d	SV (TRT 79)
+	*Salsola kali* L. (*S. pestifer* A. Nels.)	Russian Thistle	28a,b;30d	JLR (TRT 73)
	AMARANTHACEAE	AMARANTH FAMILY		
+	*Amaranthus blitoides* S. Wats. (*A. graecizans auct., non* L.)	Prostrate Pigweed	28-30	JLR (TRT 75)

	Species	Common Name	Community Type	Source
+	*Amaranthus powellii* S. Wats. (*A. retroflexus* L. var. *powellii* (S. Wats.) Boivin)	Green Pigweed	30	SV (TRT 90)
	NYCTAGINACEAE	FOUR-O'CLOCK FAMILY		
+	*Mirabilis nyctaginea* (Michx.) MacM.	Wild Four-o'clock	30	JLR (TRT 73)
	PORTULACACEAE	PURSLANE FAMILY		
	Claytonia caroliniana Michx.	Broad-leaved Spring Beauty	17,23,32	JLR (TRT 75)
	Claytonia virginica L.	Narrow-leaved Spring Beauty	7,17,23,32	JLR (TR 75) JK & PC (MP 74)
	CARYOPHYLLACEAE	PINK FAMILY		
+	*Arenaria serpyllifolia* L.	Thyme-leaved Sandwort	30,31	JK & PC (MP 74) JLR & SV (TRT 79)
+	*Cerastium fontanum* Baumg. (ssp. *triviale* (Link) Jatas; *C. vulgatum* L.)	Mouse-eared Chickweed	15,16,22,32	JLR (TRT 73) SV & KL (TRT 79) SV (TRT 79) JK & PC (MP 74)
+	*Cerastium tomentosum* L.	Dusty Miller	30	JLR (TRT 75) JK & PC (MP 74)
+	*Dianthus armeria* L.	Deptford Pink	30	SV (SR 90)
+	*Myosoton aquaticum* (L.) Moench (*Stellaria aquatica* (L.) Scop.)		6a	JLR & KL (TRT 74)
+	*Saponaria officinalis* L.	Bouncing-bet, Soapwort	11,12,28,29, 31,32	JLR (TRT 73) JK & PC (MP 74)
	Silene antirrhina L.	Sleepy Catchfly	30	SV (TRT 89)
+	*Silene noctiflora* L.	Night-flowering Catchfly	30	JK & PC (MP 74)
+	*Silene pratensis* (Rafn.) Godr. & Gren. (*S. alba* (Mill.) E.H.L. Krause)	White Cockle	30	JK & PC (MP 74)
+	*Silene vulgaris* (Moench) Garcke (*S. cucubalus* Wibel)	Bladder Campion	22,30	JLR (TRT 73) JK & PC (MP 74)
+	*Stellaria graminea* L.	Grass-leaved Stitchwort	30	JK & PC (MP 74) SV & PMC (TRT 80) JK & PC (MP 74)
	Stellaria longifolia Willd.	Long-leaved Chickweed	7b	SV (TRT 90)
+	*Stellaria media* (L.) Vill.	Common Chickweed		CSWD (SR 83)

Species	Common Name	Community Type	Source
NYMPHAEACEAE	WATER-LILY FAMILY		
Nuphar variegata Durand	Bullhead Lily	2	JLR (TRT 73) JK & PC (MP 74)
Nymphaea odorata Ait. (incl. *N. tuberosa* Paine)	Fragrant Water-lily	2	JLR (TRT 73) JK & PC (MP 74)
CERATOPHYLLACEAE	HORNWORT FAMILY		
Ceratophyllum demersum L.	Common Coontail	2	JLR (TRT 73)
RANUNCULACEAE	CROWFOOT FAMILY		
Actaea pachypoda Ell. (*A. alba sensu* Bibel.)	White Baneberry, Doll's-eyes	7,12-26,32,33	JLR (TRT 73) JK & PC (MP 74)
Actaea rubra (Ait.) Willd.	Red Baneberry	7,10,12-26,32, 33	JLR (TRT 73) JK & PC (MP 74)
Actaea X*ludovici* Boivin	(*A. pachypoda* X *A. rubra*)	17,23	SV (SR 90)
Anemone canadensis L.	Canada Anemone	5,11,12,30	JLR (TRT 73) JK & PC (MP 74)
Anemone quinquefolia L.	Wood-anemone	12,13,15-19, 21-25,32,33	JK & PC (MP 74) JLR & DH (TRT 76) JLR (TRT 73,75) SV (TRT 80)
Anemone virginiana L. (incl. *A. riparia* Fern.)	Thimbleweed	11,12,15-19, 21,22,29-33	JK & PC (MP 74) JLR (TRT 73) SV & KL (TRT 79) SV (TRT 79) RWJ (TRT 90)
Aquilegia canadensis L.	Wild Columbine	12,13,15-19, 21-25,32,33	JLR (TRT 73) JK & PC (MP 74) SV (TRT 79)
+ *Aquilegia vulgaris* L.	Garden Columbine	16	MO (SR 80)
Caltha palustris L.	Marsh-marigold	4-7	JK & PC (MP 74)
Clematis virginiana L.	Virgin's-bower	11-13,30,31	JLR (TRT 73) SV & JLR (TRT 79)
Coptis trifolia (L.) Salisb. (*C. groenlandica* (Oeder) Fern.)	Gold-thread	8	SV (SR 89)
Hepatica acutiloba DC.	Sharp-lobed Hepatica	12,13,16-19, 21-26,32,33	JLR (TRT 75) JK & PC (MP 74)
Ranunculus abortivus L.	Small-flowered Buttercup	7,12,13,15,19, 21-25,32,33	JLR (TRT 75) JK & PC (MP 74) SV & KL (TRT 79) SV (TRT 80)

	Species	**Common Name**	**Community Type**	**Source**
+	*Ranunculus acris* L.	Tall Buttercup	7,30-33	JLR (TRT 73,75) JK & PC (MP 74)
	Ranunculus hispidus Michx. var. *caricetorum* (Greene) T. Duncan (*R. septentrionalis* Poir.)	Swamp Buttercup	5-8,10	SV & JLR (TRT 79) JLR (TRT 73) JK & PC (MP 74) DC (TRT 80)
	Ranunculus longirostris L. (*R. aquatilis* L. var. *longirostris* (Godr.) Laws.)	White Water-crowfoot	2	JLR (TRT 73)
	Ranunculus recurvatus Poir.	Hooked Buttercup	5,8,10,12,17,19	JLR (TRT 73) JK & PC (MP 74)
+	*Ranunculus repens* L.	Creeping Buttercup	12,15,22,30	SV (SR 84)
	Ranunculus sceleratus L.	Cursed Crowfoot	5,28	JLR (TRT 73) JK & PC (MP 74)
	Thalictrum dioicum L.	Early Meadow Rue	12-26,32,33	JLR (TRT 73,75) JK & PC (MP 74) SV (TRT 80) RWJ (TRT 90)
	Thalictrum pubescens Pursh (*T. polygamum* Bart.)	Tall Meadow Rue	5-7,12,13	JLR (TRT 73) JK & PC (MP 74)
	BERBERIDACEAE	BARBERRY FAMILY		
+	*Berberis thunbergii* DC.	Japanese Barberry	12,15,23,30	JLR (TRT 75) JK & PC (MP 74) SV & KL (TRT 79)
+	*Berberis vulgaris* L.	Common Barberry	30	JLR (TRT 73)
	Caulophyllum thalictroides (L.) Michx.	Blue Cohosh		
	var. *giganteum* Farw.		7,12-14,16-19, 23,25,32	JLR & SV (TRT 80) JLR & DH (TRT 76) SV (TRT 80) JK & PC (MP 74)
	var. *thalictroides*		17,23	SV (SR 90)
+	*Mahonia aquifolia* (Pursh) Nutt. (*Berberis aquifolium* Pursh)	Oregon Grape	22,32	JLR (TRT 75) JK & PC (MP 74) SV & JEE (TRT 81)
	Podophyllum peltatum L.	May-apple	7,12,13,15-19, 21-25,32	JLR (TRT 73) JK & PC (MP 74)

	Species	Common Name	Community Type	Source
	MENISPERMACEAE	MOONSEED FAMILY		
	Menispermum canadense L.	Moonseed	7,12,30	SV (TRT 88)
	PAPAVERACEAE	POPPY FAMILY		
+	*Chelidonium majus* L.	Celandine	7,13,17,23,25, 32,33,37	JLR (TRT 73) JK & PC (MP 74)
	Sanguinaria canadensis L.	Bloodroot	13,16,17,23,31, 37	JLR (TRT 75) SV (TRT 80) JK & PC (MP 74)
	FUMARIACEAE	FUMITORY FAMILY		
	Dicentra canadensis (Goldie) Walp.	Squirrel-corn	7,12,17,23	SV (SR 90) JLR (SR 73) JK & PC (SR 74)
	Dicentra cucullaria (L.) Bernh.	Dutchman's-breeches	12,23	SV & JLR (TRT 80)
	BRASSICACEAE	MUSTARD FAMILY		
+	*Alliaria petiolata* (Bieb.) Cavara & Grande (*A. officinalis* Andrz. *ex* Bieb.)	Garlic Mustard	32j	SV (SR 90)
+	*Alyssum alyssoides* (L.) L.	Pale Alyssum	30d	PC (TRT 74)
	Arabis canadensis L.	Sicklepod	15,16,21,22	PC (TRT 74)
	Arabis glabra (L.) Bernh.	Tower-mustard	16,30	JK & PC (MP 74) SV (TRT 89)
	Arabis hirsuta (L.) Scop. var. *pycnocarpa* (Hopkins) Rollins	Rock-cress		MW (TRT 1903)
	Arabis laevigata (Muhl.) Poir.	Smooth Rock-cress	16	MO (TRT 80)
+	*Barbarea vulgaris* R. Br.	Yellow Rocket	5,12,13,30	JLR (TRT 73,75) JK & PC (MP 74)
+	*Brassica rapa* L. (incl. *B. campestris*)	Field Mustard, Turnip	30	JK & PC (MP 74)
	Cakile edentula (Bigel.) Hook. var. *lacustris* Ferr	Sea-rocket	28a,b	PMC (SR 72) JLR (SR 73) SV (SR 88)
+	*Camelina microcarpa* Andrz. *ex* DC.	Small-seeded False Flax	30	JK & PC (MP 74) JK & PC (MP 74)
+	*Capsella bursa-pastoris* (L.) Medic.	Shepherd's-purse	30	JK & PC (MP 74) JK & PC (MP 74)
	Cardamine bulbosa (Muhl.) BSP.	Spring Cress	5,7	SV (TRT 90)
	Cardamine pensylvanica Muhl.	Bitter Cress	8	SV (TRT 89)

	Species	Common Name	Community Type	Source
	Dentaria diphylla Michx.	Toothwort	7,12,13,17,19, 22,23,25	JLR (TRT 73,75) JLR & DH (TRT 76) SV (TRT 80) RWJ (TRT 90)
	Dentaria laciniata Muhl.	Cutleaf Toothwort	7,12,13,17,19, 23,32	JLR (TRT 75) JK & PC (MP 74)
	Dentaria X *maxima* Nutt.	(*D. diphylla* X *D. laciniata*)	17,19,23	JLR & DH (TRT 76)
+	*Diplotaxis tenuifolia* (L.) DC.	Wall-rocket	27,28	JLR (TRT 73) PC (TRT 74) JK & PC (MP 74)
+	*Erucastrum gallicum* (Willd.) O.E. Schulz	Dog Mustard	30	PC (TRT 74) JK & PC (MP 74)
+	*Erysimum cheiranthoides* L.	Wormseed Mustard	12,30	JLR & KL (TRT 74) JLR (TRT 73) JK & PC (MP 74) RWJ (TRT 90)
+	*Hesperis matronalis* L.	Dame's-rocket	11-13,17,23,32	JLR (TRT 73) JK & PC (MP 74)
+	*Lepidium campestre* (L.) R. Br.	Field Pepper-grass	30	JLR & DH (TRT 76) JLR (TRT 75) MO (TRT 80) SV & PMC (TRT 80)
+	*Lepidium densiflorum* Schrad.	Common Pepper-grass	30	JK & PC (MP 74) SV (TRT 89)
+	*Nasturtium microphyllum* (Boenn.) Reichenb. (incl. *N. officinale* R. Br.)	Water Cress	5,10	SV (TRT 90)
+	*Raphanus raphanistrum* L.	Wild Radish	30d	JLR (TRT 73)
	Rorippa palustris (L.) Besser	Marsh Yellow Cress		
	ssp. *fernaldiana* (Butt. & Abbe) Jonsell (*R. islandica* (Oeder) Borbas var. *fernaldiana* Butt. & Abbe)		28	JLR (TRT 75)
	ssp. *hispida* (Desv.) Jonsell (*R. islandica* (Oeder) Borbas var. *hispida* (Desv.) Butt. & Abbe)		28	JLR (TRT 75) JK & PC MP 74)
+	*Rorippa sylvestris* (L.) Besser	Creeping Yellow Cress	30	JLR (TRT 73)
+	*Sinapis arvensis* L. (*Brassica kaber* (DC.) L.C.Wheeler var. *pinnatifida* (Stokes) L.C. Wheeler)	Charlock	30	JK & PC (MP 74) SV (TRT 90)

	Species	Common Name	Community Type	Source
+	*Sisymbrium altissimum* L.	Tumble Mustard	30	JLR (TRT 73) JK & PC (MP 74)
+	*Thlaspi arvense* L.	Penny Grass	30	JK & PC (MP 74)
	CRASSULACEAE	ORPINE FAMILY		
	Penthorum sedoides L.	Ditch Stonecrop	5	JLR & KL (TRT 76)
+	*Sedum acre* L.	Mossy Stonecrop	30	JLR (TRT 73) JK & PC (MP 74)
	SAXIFRAGACEAE	SAXIFRAGE FAMILY		
	Mitella diphylla L.	Bishop's Cap	7-10,17,19,23, 25	JLR (TRT 73,75) JK & PC (MP 74) SV (TRT 80) RWJ (TRT 90)
	Mitella nuda L.	Naked Mitrewort	8,10	SV (TRT 84)
	Tiarella cordifolia L.	Foam Flower	8-10,17,19,23, 25	JLR (TRT 73) JK & PC (MP 74)
	GROSSULARIACEAE	GOOSEBERRY FAMILY		
	Ribes americanum Mill.	Wild Black Currant	4-8,10,12,13,19	JLR (TRT 73) JK & PC (MP 74) SV (TRT 88)
	Ribes cynosbati L.	Prickly Gooseberry	12,15-19,22-26, 32,33	SV & JLR (TRT 79) JLR (TRT 73) SV (TRT 79,80) JK & PC (MP 74)
	Ribes hirtellum Michx. (*R. oxyacanthoides* L.) var. *hirtellum* (Michx.) Scoggan)	Canada Gooseberry	15	SV (TRT 79) JK & PC (MP 74)
+	*Ribes rubrum* L. (*R. sylvestre* (Lam.) Mert. & Koch; *R. sativum* Syme)	Red Currant	7,15,17,23,30, 32	JLR (TRT 73,80) SV & KL (TRT 79) JK & PC (MP 74) MO (TRT 80) DC (TRT 80) SV (TRT 84)
	Ribes triste Pall.	Swamp Red Currant	8,10	SV (TRT 88)
	HAMAMELIDACEAE	WITCH-HAZEL FAMILY		
	Hamamelis virginiana L.	Witch-hazel	15-17,21,22,24, 32	JLR (TRT 73,75) JK & PC (MP 74)
	PLATANACEAE	PLANE-TREE FAMILY		
	Platanus occidentalis L.	Sycamore	12	JLR & DH (TRT 76)

Species	Common Name	Community Type	Source
ROSACEAE	ROSE FAMILY		
Agrimonia gryposepala Wallr.	Agrimony	12,15,21,30-32	JLR (TRT 73) JK & PC (MP 74) SV (TRT 79)
Agrimonia pubescens Wallr.	Agrimony	29b,c	SV (TRT 89)
Amelanchier arborea (Michx. f.) Fern.	Juneberry, Serviceberry	15,21,22	SV (SR 90)
Amelanchier laevis Wieg.	Juneberry, Serviceberry	15,21,22	JK & PC (MP 74) MO (TRT 80)
Amelanchier sanguinea (Pursh) DC. var. *sanguinea*	Juneberry, Serviceberry	15,21,30-32	JLR (TRT 73,75) PC (TRT 74) JK & PC (MP 74) SV (TRT 89)
Amelanchier spicata (Lam.) K. Koch var. *spicata*	Juneberry, Serviceberry	15,16,18,19, 30-32	JLR (TRT 73,75) GW (TRT 80) GC (TRT 80) DC (TRT 80) SV (TRT 79) JK & PC (MP 74)
Crataegus aboriginum Sarg.	Hawthorn	30,31	SV (TRT 90)
Crataegus corusca Sarg. (*C. hillii* Sarg.)	Hawthorn	30,31	SV (TRT 90)
Crataegus flabellata (Spach) Kirchner	Hawthorn	30,31	JK & PC (MP 74)
Crataegus holmesiana Ashe	Holmes' Hawthorn	15-17,21-23, 30-32	SV (TRT 90)
+ *Crataegus monogyna* Jacq.	English Hawthorn	30	JR (SR 90)
Crataegus pedicellata Sarg.	Hawthorn	15-17,21-23, 30-37	PC (TRT 74) JK & PC (MP 74) SV (TRT 90)
Crataegus pringlei Sarg.	Hawthorn	30,31	SV (TRT 90) JK & PC (MP 74)
Crataegus punctata Jacq.	Dotted Hawthorn	7,31	SV (TRT 90)
Crataegus succulenta Link var. *macracantha* (Loud.) Eggles. (incl. var. *occidentalis* (Britt.) Palm.)	Hawthorn	30-37	JLR (TRT 73,77) JK & PC (MP 74) SV J(TRT 90)
Fragaria vesca L.	Woodland Strawberry	5,8,15-17,23,32	JLR (TRT 73) SV & KL (TRT 79) JK & PC (MP 74)

	Species	Common Name	Community Type	Source
	Fragaria virginiana Dcne.	Common Strawberry	7,10,15,16,21-23,29-33	JLR (TRT 73) JK & PC (MP 74)
	Geum aleppicum Jacq. var. *strictum* (Ait.) Fern.	Yellow Avens	5,7,8,10,12,13	JLR (TRT 73) JK & PC (MP 74)
	Geum canadense Jacq.	White Avens	5,7,11-13,15-17,22,23,32,33	JLR (TRT 73) JK & PC (MP 74) SV (TRT 79)
+	*Malus domestica* Borkh. (*Pyrus malus* L.)	Apple	12,13,30-37	JLR (TRT 73) JK & PC (MP 74)
	Potentilla anserina L.	Silverweed	11,27,28	JLR (TRT 73) JK & PC (MP 74)
+	*Potentilla argentea* L.	Silvery Cinquefoil	30	JK & PC (MP 74)
+	*Potentilla norvegica* L.	Rough Cinquefoil	30	JLR (TRT 73) JK & PC (MP 74)
	Potentilla palustris (L.) Scop.	Marsh Cinquefoil	4,5	JLR (TRT 73)
	Potentilla paradoxa Nutt.	Lower Great Lakes Cinquefoil	28	JLR (TRT 75) PMC & SM (TRT 74)
+	*Potentilla recta* L.	Rough-fruited Cinquefoil	11,27-37	JLR (TRT 73) JK & PC (MP 74)
	Potentilla simplex Michx. (incl. *P. canadensis sensu auct.*)	Common or Old-field Cinquefoil	15,16,21,22,28c	JK & PC (MP 74) SV & KL (TRT 79)
+	*Prunus avium* L.	Sweet Cherry	32	SV (SR 84)
+	*Prunus glandulosa* Ait.		30	JLR (TRT 75)
	Prunus nigra Ait.	Canada Plum	15,16	JLR (TRT 75) JK & PC (MP 74)
	Prunus pensylvanica L. f.	Pin Cherry	30-32	JK & PC (MP 74) JLR & SV (TRT 80)
	Prunus serotina Ehrh.	Wild Black Cherry	12-24,26,31-37	JLR (TRT 73) JK & PC (MP 74)
	Prunus virginiana L.	Chokecherry	7,10,12-19,21-25,32-34	JLR (TRT 73,75) JK & PC (MP 74) SV & KL (TRT 79)
+	*Pyrus communis* L.	Pear	30-33	JLR (TRT 75) JK & PC (MP 74)
	Rosa blanda Ait.	Wild Rose	15,16,21,22,32	SV & JLR (TRT 79) JLR (TRT 73) JK & PC (MP 74)

	Species	Common Name	Community Type	Source
+	*Rosa multiflora* Thunb. (incl. var. *cathayensis* Rehd. & E.H. Wils.)	Multiflora, Japanese Rose	12,13	JLR (TRT 73) SV (TRT 79) JK & PC (MP 74)
	Rosa palustris Marsh.	Swamp Rose	5,6	SV (TRT 88)
	Rubus allegheniensis Porter	Common Blackberry	15,21,22,29-33	JLR (TRT 73) JK & PC (MP 74) SV (TRT 84)
	Rubus occidentalis L.	Black Raspberry	7,10,12,13,15-19,21-25,30-37	JLR (TRT 73) JK & PC (MP 74) SV (TRT 79,80)
	Rubus odoratus L.	Flowering Raspberry	10,12,13,16-19, 23,25,32,33	JLR (TRT 74) JK & PC (MP 74)
	Rubus pubescens Raf.	Dwarf Raspberry	5,7-10	JLR & DH (TRT 76)
	Rubus strigosus Michx. (*R. idaeus* L. var. *strigosus* (Michx.) Maxim.)	Wild Red Raspberry	5,7,8,10-26,29-37	JLR (TRT 73) JK & PC (MP 74) SV & KL (TRT 79)
+	*Sorbaria sorbifolia* (L.) A.Br.	False Spiraea	17,30,32	JLR (TRT 73,75) JLR & DH (TRT 76) JK & PC (MP 74)
+	*Sorbus aucuparia* L. (*Pyrus aucuparia* (L.) Gaertn.)	European Mountain-ash	30	JR (SR 90)
	Spiraea alba DuRoi (incl. *S. latifolia* (Ait.) Borkh.)	Meadowsweet	5,6	JLR (TRT 73) JK & PC (MP 74) SV (TRT 80,84)
	Waldsteinia fragarioides (Michx.) Tratt.	Barren Strawberry	15,16,21,22,32	JLR (TRT 75) JK & PC (MP 74) RWJ (TRT 90)
	FABACEAE	PEA FAMILY		
	Amphicarpaea bracteata (L.) Fern.	Hog-peanut	5,7,9,11-13,15-17,19,21-23,25, 27,32,33	JLR (TRT 73) JK & PC (MP 74) RWJ (TRT 90)
	Apios americana Medic.	Groundnut	5-7,11-13,27	JK & PC (MP 74)
	Astragalus canadensis L.	Canada Milk-vetch, Locoweed	21	SV (TRT 84)
+	*Caragana arborescens* Lam.	Pea-tree	30,32	JLR (TRT 73)
+	*Coronilla varia* L.	Crown Vetch	5,11,12,27-31	JLR (TRT 77)
	Desmodium canadense (L.) DC.	Tick-trefoil	5,11,12,21,29-31	JLR (TRT 73) JK & PC (MP 74) SV (TRT 89)

	Species	Common Name	Community Type	Source
	Desmodium glutinosum (Muhl.) Wood	Tick-trefoil	7,12,13,15-26, 31-37	JLR (TRT 73) JK & PC (MP 74) RWJ (TRT 90)
	Desmodium nudiflorum (L.) DC.	Tick-trefoil	22	GA (SR 90)
+	*Gleditsia triacanthos* L.	Honey Locust	30	SV (SR 90)
	Lathyrus ochroleucus Hooker	Pale Vetchling	15	JLR (TRT 73) MW (TRT 1903)
	Lathyrus palustris L.	Marsh Pea	4-7,15	JLR (TRT 73) JK & PC (MP 74)
+	*Lotus corniculatus* L.	Bird-foot Trefoil	11,12,27-32	JLR (TRT 73)
+	*Lupinus polyphyllus* Lindl.	Lupine	30	JLR (TRT 73)
+	*Medicago lupulina* L.	Black Medic	11-13,27-33	JLR (TRT 73,75) SV (TRT 80)
+	*Medicago sativa* L. ssp. *sativa*	Alfalfa	30	PC (TRT 74) SV (TRT 90)
+	*Melilotus alba* Medic.	White Sweet-clover	5,11,12,27-33	JLR (TRT 73) JK & PC (MP 74)
+	*Melilotus officinalis* (L.) Pall.	Yellow Sweet-clover	30	JLR (TRT 73) JK & PC (MP 74)
+	*Robinia pseudoacacia* L.	Black Locust	30,32j,33,34,36	SV (SR 88)
+	*Trifolium hybridum* L.	Alsike Clover	30	SV (TRT 90)
+	*Trifolium pratense* L.	Red Clover	11,12,27-36	JK & PC (MP 74)
+	*Trifolium repens* L.	White Clover	11,12,27-37	JLR (TRT 73) JK & PC (MP 74)
+	*Vicia cracca* L.	Bird Vetch	5,11,12,27-31	JLR (TRT 73,75) JK & PC (MP 74)
+	*Vicia sativa* L. ssp. *nigra* (L.) Ehrh. (*V. angustifolia* Reich.; *V. sativa* L. var. *angustifolia* (L.) Wahl.)	Common Vetch	30	SV (TRT 90)
	GERANIACEAE	GERANIUM FAMILY		
	Geranium maculatum L.	Wild or Spotted Cranesbill	15-19,21-25	JLR (TRT 73,75) JK & PC (MP 74) SV (TRT 79)
	Geranium robertianum L.	Herb Robert	7-10,12-14,17, 19,23,25,32-37	JLR (TRT 73) JK & PC (MP 74)

	Species	Common Name	Community Type	Source
	OXALIDACEAE	WOOD-SORREL FAMILY		
	Oxalis fontana Bunge (*O. stricta auct. amer.*, *non* L., *O. europaea* Jordan)	Wood-sorrel	6,11-13,27-37	JLR (TRT 73,75) JK & PC (MP 74) MO (TRT 80)
	Oxalis stricta L. (*O. dillenii* Jacq.)	Common Wood-sorrel	30	SV (TRT 90)
	LINACEAE	FLAX FAMILY		
+	*Linum usitatissimum* L.	Common Flax	30d	JLR (TRT 73)
	RUTACEAE	RUE FAMILY		
	Zanthoxylum americanum Mill. (*Xanthoxylum americanum* Mill.)	Prickly-ash	30	JK & PC (MP 74)
	SIMAROUBACEAE	QUASSIA FAMILY		
+	*Ailanthus altissima* (Mill.) Swingle	Tree-of-heaven	30	JK & PC (MP 74)
	POLYGALACEAE	MILKWORT FAMILY		
	Polygala paucifolia Willd.	Fringed Polygala	18,21,22,24	JLR (TRT 75 SV (TRT 79) JK & PC (MP 74)
	Polygala senega L.	Seneca-snakeroot	30c	SV (TRT 89)
	EUPHORBIACEAE	SPURGE FAMILY		
	Acalypha rhomboidea Raf.	Three-seeded Mercury	5,27,30	JLR (TRT 75)
+	*Euphorbia cyparissias* L.	Cypress Spurge	30d	JLR (TRT 73) JK & PC (MP 74) SV (TRT 83)
+	*Euphorbia dentata* Michx.	Spurge	30d	JLR (TRT 75)
	Euphorbia glyptosperma Engelm.	Ridge-seeded Spurge	30	JK (TRT 74) JLR (TRT 73,75)
	Euphorbia polygonifolia L.	Seaside Spurge	28a,b	JLR (TRT 75)
	ANACARDIACEAE	CASHEW FAMILY		
	Rhus radicans L.	Poison-ivy		
	ssp. *radicans* (*Toxicodendron radicans* (L.) Kuntze)		7,11-26,29-37	JK (SR 74) SV (SR 89,90)
	ssp. *rydbergii* (Sm. *ex* Rydb.) McNeill (*Toxicodendron rydbergii* (Sm. *ex* Rydb.) Greene; *Rhus toxicodendron* L. var. *rydbergii* (Sm. *ex* Rydb.) Garrett)		7,12,13,30,32	JLR (TRT 73)

Species	Common Name	Community Type	Source
Rhus typhina L.	Staghorn Sumac	11,29-34,36	JLR (TRT 73) JK & PC (MP 74)
AQUIFOLIACEAE	HOLLY FAMILY		
Ilex verticillata (L.) Gray	Winterberry	5	SV (TRT 88)
CELASTRACEAE	STAFF-TREE FAMILY		
Celastrus scandens L.	Climbing Bittersweet	15,16,19,21,22, 30-32	JLR (TRT 73,75) SV & JLR (TRT 79) JK & PC (MP 74)
STAPHYLEACEAE	BLADDERNUT FAMILY		
Staphylea trifolia L.	Bladdernut	12,13,16,17,30	JLR & DH (TRT 76)
ACERACEAE	MAPLE FAMILY		
Acer negundo L.	Manitoba Maple	5-7,11-14,19, 26,27,29-32,34	JLR (TRT 73)
Acer nigrum Michx. f.	Black Maple	12,13,17,19,23	JK & PC (MP 74) SV (TRT 83,84)
+ *Acer platanoides* L.	Norway Maple	32j,34	SV (SR 90)
Acer rubrum L.	Red Maple	7,10,15-19,21, 22,24,25,32	JK & PC (MP 74)
Acer saccharinum L.	Silver Maple	7,32j,34,36	JK & PC (MP 74)
Acer saccharum Marsh.	Sugar Maple	5,7-10,12-26, 29-37	JLR (TRT 73)
Acer spicatum L.	Mountain Maple	5,7-10,12-14, 17-19,23,25,32-33	JK & PC (MP 74)
HIPPOCASTANACEAE	BUCKEYE FAMILY		
+ *Aesculus hippocastanum* L.	Horse Chestnut		CSWD (SR 83)
BALSAMINACEAE	TOUCH-ME-NOT FAMILY		
Impatiens capensis Meerb. (*I. biflora* Walt.)	Spotted Jewelweed, Touch-me-not	3-14,17,23,25	JK & PC (MP 74)
Impatiens pallida Nutt.	Jewelweed	5,12,13,17,19, 23,25	SV (TRT 90)
RHAMNACEAE	BUCKTHORN FAMILY		
Ceanothus americanus L.	New Jersey Tea	15,21,22,30c	JK (TRT 74) JLR (TRT 73) SV & KL (TRT 79)

	Species	Common Name	Community Type	Source
+	*Rhamnus cathartica* L.	Common Buckthorn	7,12,15-24,26, 29-37	JLR (TRT 73) SV & JLR (TRT 79) SV & KL (TRT 79) SV (TRT 79) JK & PC (MP 74)
	VITACEAE	GRAPE FAMILY		
	Parthenocissus inserta (A. Kerner) K. Fritsch (*P. vitacea* (Knerr) Hitchc.)	Virginia Creeper	7-13,15-19,23, 25,32-34	JLR (TRT 73) JK & PC (MP 74) SV (TRT 88)
	Vitis riparia Michx.	Riverbank Grape	5,7,11-26,28-37	JLR (TRT 73) JK & PC (MP 74)
	TILIACEAE	LINDEN FAMILY		
	Tilia americana L.	Basswood	5,7-10,12-26, 29-37	JLR (TRT 73) JK & PC (MP 74)
	MALVACEAE	MALLOW FAMILY		
+	*Alcea rosea* L. (*Althaea rosea* L.)	Hollyhock	30	JK & PC (MP 74)
	HYPERICACEAE	ST. JOHN'S-WORT FAMILY		
	Hypericum ascyron L. (*H. pyramidatum* Ait.)	Great St. John's-wort	5a	SV (TRT 80)
+	*Hypericum perforatum* L.	Common St. John's-wort	11,12,15,21,27-37	JLR (TRT 73) JK & PC (MP 74) SV (TRT 79)
	Hypericum punctatum Lam.	Spotted St. John's-wort	5f	SV (TRT 89)
	VIOLACEAE	VIOLET FAMILY		
	Viola affinis Le Conte	Marsh Violet	7	SV (TRT 83)
	Viola blanda Willd.	Sweet White Violet	8,10,19,25	JLR & SV (TRT 80) JK & PC (MP 74)
	Viola canadensis L.	Canada Violet	7,12,17,23	JLR & SV (TRT 80) SV (TRT 80,90)
	Viola conspersa Reich.	Dog Violet	15-17,21-23,32	JLR & SV (TRT 79) JLR & DH (TRT 76) JLR (TRT 73,75) JK & PC (MP 74) SV (TRT 80,90)
	Viola cucullata Ait.	Marsh Violet	5,7,8,10	SV (TRT 90)

Species	Common Name	Community Type	Source
Viola pallens (Banks) Brain. (*V. macloskeyi* Lloyd ssp. *pallens* (Banks) M.S. Baker)	Smooth White Violet	8	SV (SR 89)
Viola pubescens Ait. (incl. var. *pubescens* and var. *scarbriuscula* T. & G.; *V. pensylvanica sensu* *auct., non* Michx. var. *leiocarpa* (Fern. & Wieg.) Fern.)	Downy Yellow Violet		
f. leiocarpa		7,12-14,16,17, 19,21-26,32	JLR (TRT 73,75) SV (TRT 80)
f. pubescens		21,22	SV (TRT 79,84)
Viola selkirkii Pursh	Great-spurred Violet	13,25	SV (TRT 90)
Viola sororia Willd.	Common Blue Violet	7-10,12,13,15-1 7,21-23,32	JLR (TRT 73,75) JK & PC (MP 74) SV & KL (TRT 79) SV (TRT 80,84)
ELAEAGNACEAE	OLEASTER FAMILY		
Shepherdia canadensis (L.) Nutt.	Soapberry, Buffaloberry	15-16,30-33	JLR (TRT 73,75) JK & PC (MP 74) SV (TRT 84)
LYTHRACEAE	LOOSESTRIFE FAMILY		
+ *Lythrum salicaria* L.	Purple Loosestrife	3-7,10,11,28,30	JK & PC (MP 74)
ONAGRACEAE	EVENING-PRIMROSE FAMILY		
Circaea alpina L.	Small Enchanter's Nightshade	5,8-10,14,19, 25,32	JLR (TRT 73) JK & PC (MP 74) SV (TRT 79)
Circaea lutetiana L. var. *canadensis* L. (*C. quadrisulcata* (Maxim.) Franch. & Sav.)	Enchanter's Nightshade	5,7,12-26,31-37	JLR (TRT 73) JK & PC (MP 74) RWJ (TRT 90)
Epilobium angustifolium L.	Fireweed	16,30	JLR (SR 73)
Epilobium ciliatum Raf. (*E. glandulosum* Lehm. var. *adenocaulon* (Haussk.) Fern.; includes typical *E. glandulosum* Lehm.)	Sticky Willowherb	4-8	JLR (TRT 73) JK & PC (MP 74)
Epilobium coloratum Bieh.	Purple-leaved Willowherb	5	JLR (TRT 73)

	Species	Common Name	Community Type	Source
+	*Epilobium hirsutum* L.	Hairy Willowherb	3-6	JLR (TRT 73) JK & PC (MP 74)
	Epilobium leptophyllum Raf.	Willowherb	5c	SV (TRT 80)
+	*Epilobium parviflorum* Schreb.	Willowherb	5,10	SV (TRT 90)
	Ludwigia palustris (L.) Ell. (var. *americana* (DC.) Fern. & Griseb.)	False Loosestrife	28d	SV & GA (TRT 88)
	Oenothera biennis L.	Hairy Yellow Evening-primrose	28-30	JK & PC (MP 74)
	Oenothera oakesiana (A. Gray) Robbins		30	JLR (TRT 73)
	Oenothera parviflora L.	Small-flowered Evening-primrose	28-30	JLR (TRT 73) JK & PC (MP 74)
+	*Oenothera pilosella* Raf.	Sundrops	30	JK (TRT 74)
	HALORAGACEAE	WATER MILFOIL FAMILY		
	Myriophyllum exalbescens Fern. (*M. sibiricum* Kom.)	Northern Water-milfoil	2	JLR (SR 73)
	Myriophyllum verticillatum L.	Green Water-milfoil	2	JLR (TRT 73) SV (TRT 88)
	ARALIACEAE	GINSENG FAMILY		
	Aralia nudicaulis L.	Wild Sarsaparilla	7,12-25,32-34	JLR (TRT 73,75)
	Aralia racemosa L.	Spikenard	13,17-19,23	JLR & SV (TRT 79)
	Panax quinquefolius L.	Ginseng	13,17	SV (TRT 90)
	APIACEAE	CARROT FAMILY		
+	*Aegopodium podagraria* L.	Goutweed	30,32,33	JLR (TRT 73) SV (TRT 90)
	Angelica atropurpurea L.	Angelica	5,11,12,30	JLR (TRT 73) SV & GA (TRT 88)
	Cicuta bulbifera L.	Bulbous Water-hemlock	3-5,7	SV (TRT 80)
	Cicuta maculata L.	Spotted Water-hemlock	4-7	JLR (TRT 73) JK & PC (MP 74)
	Cryptotaenia canadensis (L.) DC.	Honewort	12,13,19	JLR (TRT 73) SV & JLR (TRT 79) JK & PC (MP 74) SV (TRT 79)
+	*Daucus carota* L.	Wild Carrot, Queen Anne's Lace	11-13,15,16, 27-33	JLR (TRT 78) JK & PC (MP 74)

Species	Common Name	Community Type	Source
Heracleum maximum Bartr. (*H. lanatum* Michx.)	Cow-parsnip	12	JLR (TRT 73)
Hydrocotyle americana L.	Marsh Pennywort	5,8,10	JLR (TRT 75)
Osmorhiza claytonii (Michx.) Clarke	Sweet Cicely	17-19,22-25,37	JK & PC (MP 74) SV (TRT 79)
+ *Pastinaca sativa* L.	Wild Parsnip	5,30	JLR (TRT 75) JK & PC (MP 74)
Sanicula marilandica L.	Black Snakeroot	15,16,21,22	JLR (TRT 73) JK & PC (MP 74) SV (SR 89)
Sium suave Walt.	Water-parsnip	4-7	SV (TRT 90)
Taenidia integerrima (L.) Drude	Yellow Pimpernel	15,16,30c	JK & PC (MP 74)
CORNACEAE	DOGWOOD FAMILY		
Cornus alternifolia L.f.	Alternate-leaved Dogwood	5,7-13,16-19, 22-26,32-33	JLR (TRT 73) SV & JLR (TRT 79) JLR & DH (TRT 76) JK & PC (MP 74)
Cornus amomum Mill. (*C. purpusii* Koehne, *C. obliqua* Raf.)	Silky Dogwood	5	SV (SR 88)
Cornus foemina Mill. (*C. racemosa* Lam.)	Grey Dogwood	15,21,30,31	JLR & KL (TRT 79)
Cornus rugosa Lam.	Round-leaved Dogwood	5,12,15,16,18, 19,21,22,24,31-34	JLR (TRT 73) JK & PC (MP 74)
Cornus stolonifera Michx.	Red-osier Dogwood	4-12,30,32,33	JLR (TRT 73) JK & PC (MP 74)
PYROLACEAE	WINTERGREEN FAMILY		
Monotropa hypopithys L.	Pinesap	19	SV (SR 89)
Monotropa uniflora L.	Indian-pipe	15,16,21,22,24	JLR (TRT 73) JK & PC (MP 74)
Pyrola asarifolia Michx.	Pink Pyrola, Wintergreen	21	SV (TRT 84)
Pyrola elliptica Nutt.	Shinleaf	17,22,32	JK & PC (MP 74) SV (TRT 79,84)
ERICACEAE	HEATH FAMILY		
Gaultheria procumbens L.	Checkerberry, Wintergreen	15,16,21,22	JLR (TRT 75)
Vaccinium angustifolium Ait.	Lowbush Blueberry	15,16,21	SV (TRT 84)

	Species	Common Name	Community Type	Source
	Vaccinium pallidum Ait. (*V. vacillans* Torr.)	Early Sweet Blueberry	16,21	SV (TRT 79,84)
	PRIMULACEAE	PRIMROSE FAMILY		
+	*Anagallis arvensis* L.	Scarlet Pimpernel	30d	JK & PC (MP 74)
	Lysimachia ciliata L. (*Steironema ciliata* (L.) Raf.)	Fringed Loosestrife	5-7,12,13,15, 16,19,22,31-34	JLR (TRT 73) JK & PC (MP 74) SV & KL (TRT 79) RWJ (TRT 90)
+	*Lysimachia nummularia* L.	Moneywort	7,11-13,27	JLR (TRT 73) JK & PC (MP 74)
	Lysimachia terrestris (L.) BSP.	Swamp Candles	4,5	SV (TRT 80)
	Lysimachia thyrsiflora L.	Tufted Loosestrife	4a,5a	SV (TRT 80)
	Trientalis borealis Raf.	Star-flower	8,10,16,18,19, 23-25,33	JLR (TRT 73,75) JK & PC (MP 74) SV (TRT 79)
	OLEACEAE	OLIVE FAMILY		
	Fraxinus americana L.	White Ash	5,7-26,28-37	JLR (TRT 73) JK & PC (MP 74) SV & JLR (TRT 79)
	Fraxinus nigra Marsh.	Black Ash	5-8,10,12,13	JLR (SR 73) SV (SR 90)
	Fraxinus pennsylvanica Marsh.			
	var. *pennsylvanica*	Red Ash	5-8,10,12	SV (SR 90)
	var. *subintegerrima* (Vahl) Fern.	Green Ash	5-8,10,12	JK & PC (MP 74)
+	*Ligustrum vulgare* L.	Privet	30,31	JLR (TRT 73) JK & PC (MP 74)
+	*Syringa vulgaris* L.	Common Lilac	30,31	JLR (TRT 73) JK & PC (MP 74)
	GENTIANACEAE	GENTIAN FAMILY		
	Gentiana andrewsii Griseb.	Closed Gentian	5c	SV (TRT 79)
	Gentiana crinita Froel. (*Gentianopsis crinita* (Froel.) Ma)	Fringed Gentian	5c	SV (TRT 79)
	APOCYNACEAE	DOGBANE FAMILY		
	Apocynum androsaemifolium L.	Spreading Dogbane	12,13,15-19, 21,22,30,32,33	JLR (TRT 73) SV & KL (TRT 79) SV (TRT 79) JK & PC (MP 74)
	Apocynum cannabinum L. (var. *glaberrimum* DC.)	Indian Hemp	30	JK & PC (MP 74) JLR (TRT 73)

	Species	**Common Name**	**Community Type**	**Source**
+	*Vinca minor* L.	Periwinkle	19,22,25,33	SV (TRT 79)
	ASCLEPIADACEAE	MILKWEED FAMILY		
	Asclepias exaltata L.	Poke Milkweed	15,16,21,22	JK & PC (MP 74) SV (TRT 79)
	Asclepias incarnata L.	Swamp Milkweed	3-8,10	JLR (TRT 73) JK & PC (MP 74)
	Asclepias syriaca L.	Common Milkweed	5,11,28-32	JLR (TRT 73) JK & PC (MP 74)
+	*Vincetoxicum rossicum* (Kleopov) Barbarich (*Cynanchum medium* R. Br.)	Dog-strangling Vine	5,11-26,29-37	JK & PC (MP 74) SV (TRT 90) MO (TRT 80)
	CONVOLVULACEAE	MORNING GLORY FAMILY		
	Calystegia sepium (L.) R.Br. (*Convolvulus sepium* L.)	Hedge Bindweed, Wild Morning Glory	4,5	JK & PC (MP 74) JLR (TRT 73)
	Calystegia spithamea (L.) Pursh (*Convolvulus spithameus* L.)	Low Bindweed	30	MO (TRT 80)
+	*Convolvulus arvensis* L.	Field Bindweed	30,31	JK (TRT 74) JLR (TRT 73) JK & PC (MP 74)
	Cuscuta gronovii Willd.	Swamp Dodder	5,30,31	JLR (TRT 77) SV & GA (TRT 88)
+	*Ipomoea hederacea* (L.) Jacq.	Morning Glory	30d	JLR (TRT 75)
	POLEMONIACEAE	PHLOX FAMILY		
	Phlox divaricata L.	Blue Phlox	7,12,16,17,19, 23	JLR & DH (TRT 76) JK & PC (MP 74) JLR (TRT 75) SV (TRT 90)
+	*Phlox paniculata* L.	Tall or Perennial Pink	30	JLR (TRT 73) JK & PC (MP 74)
	HYDROPHYLLACEAE	WATERLEAF FAMILY		
	Hydrophyllum canadense L.	Canada Waterleaf	17,23	SV (TRT 80)
	Hydrophyllum virginianum L.	Virginia Waterleaf	7,12,13,16-19, 22,23,25,32-34	JLR (TRT 73,75,79) JK & PC (MP 74) SV (TRT 80)
	BORAGINACEAE	BORAGE FAMILY		
+	*Cynoglossum officinale* L.	Hound's-tongue	30	JLR (TRT 73) JK & PC (MP 74)

	Species	Common Name	Community Type	Source
+	*Echium vulgare* L.	Blueweed, Viper's-bugloss	11,12,28-32	JLR (TRT 73) JK & PC (MP 74)
	Hackelia deflexa (Wahl.) Opiz var. *americana* Gray (*H. americana* (Gray) Fern.)	Stickseed, Beggar's-lice	19,21	GW (TRT 80) JK (TRT 74) SV (TRT 89)
	Hackelia virginiana (L.) Johnston	Stickseed, Beggar's-lice	15-17,21	JK & PC (MP 74) JLR (TRT 73) SV (TRT 88)
+	*Lappula squarrosa* (Retz.) Dumort (*L. echinata* Gilib.; *L. myosotis* Moench)	Stickseed	30	JK & PC (MP 74)
+	*Lithospermum officinale* L.	Pearl or Common Gromwell	30	JLR (TRT 73) SV (TRT 90)
	Myosotis laxa Lehm.	Smaller Forget-me-not	5,10	SV (TRT 80,90)
+	*Myosotis scorpioides* L.	True Forget-me-not	5,7,11-13	JLR (TRT 73,75) JK & PC (MP 74)
+	*Myosotis sylvatica* Hoffm.	Forget-me-not	30	JK & PC (MP 74)
+	*Symphytum officinale* L.	Common Comfrey	30	MO (SR 80)
	VERBENACEAE	VERVAIN FAMILY		
	Verbena hastata L.	Blue Vervain	5,11,27,30	JLR (TRT 73) JK & PC (MP 74) RWJ (TRT 90)
	Verbena stricta Vent.	Hoary Vervain	30	SV (TRT 90)
	Verbena urticifolia L.	White Vervain	5,7,11-13,30	JLR (TRT 73) JK & PC (MP 74)
	LAMIACEAE	MINT FAMILY		
+	*Acinos arvensis* (Lam.) Dandy (*Satureja acinos* (L.) Scheele)		30d	PC (TRT 74)
+	*Ajuga reptans* L.	Ajuga	12	JLR (TRT 73)
+	*Galeopsis tetrahit* L.	Hemp-nettle	12,30	JK & PC (MP 74)
+	*Glechoma hederacea* L.	Ground-ivy	7,11-13,32	JLR (TRT 73) JK & PC (MP 74)
+	*Leonurus cardiaca* L.	Motherwort	11,12,29-32	JK & PC (MP 74)
	Lycopus americanus Muhl.	American Water-horehound	3-12,28,29a	JLR (TRT 73)
+	*Lycopus europaeus* L.	European Water-horehound	3-5,11,28	JLR & KL (TRT 74) SV & GA (TRT 88)
	Lycopus uniflorus Michx.	Water-horehound	5-10,13,29a,32	JLR (TRT 73) JK & PC (MP 74)

	Species	Common Name	Community Type	Source
	Mentha arvensis L. var. *glabrata* (Benth.) Fern.	Field or Common Mint	5,7-13,30	PC (TRT 74) JK & PC (MP 74) JLR (TRT 73) RWJ (TRT 90)
+	*Mentha* X*piperita* L. (*pro. sp.*)	Peppermint	5	SV (TRT 88)
+	*Mentha* X*spicata* L. (*pro. sp.*)	Spearmint	5,30	JK & PC (MP 74)
	Monarda fistulosa L.	Wild Bergamot	5,15,16,21,22, 30-32	JLR (TRT 73) JK & PC (MP 74) SV & KL (TRT 79) SV (TRT 79) RWJ (TRT 90)
+	*Nepeta cataria* L.	Catnip	11-13,30-32	JLR (TRT 73) JK & PC (MP 74)
	Prunella vulgaris L.	Heal-all	5,8,12,13,15, 16,18,22,33	JLR (TRT 73) JK & PC (MP 74)
	Satureja vulgaris (L.) Fritsch var. *neogaea* Fern.	Dogmint	17,23,32	JK & PC (MP 74)
	Scutellaria galericulata L. (*S. epilobiifolia* A. Ham.)	Common Skullcap	3-6,28	JLR (TRT 73) JK & PC (MP 74)
	Scutellaria lateriflora L.	Mad-dog Skullcap	3-7	JLR (TRT 73)
	Teucrium canadense L.	Woodsage	11-12,30	JLR (TRT 73) SV (TRT 89)
	SOLANACEAE	NIGHTSHADE FAMILY		
	Physalis heterophylla Nees	Clammy Ground-cherry	30	JLR (TRT 75) SV (TRT 89)
	Solanum americanum Mill. (*S. nigrum* L. var. *americanum* (Mill.) Schulz)	American Nightshade	15	JLR (TRT 73) SV & JLR (TRT 79)
+	*Solanum dulcamara* L.	Bittersweet	3-12,17-19,23	JLR (TRT 73) JK & PC (MP 74)
	SCROPHULARIACEAE	FIGWORT FAMILY		
	Agalinis tenuifolia (Vahl) Raf.	Slender Gerardia	5b,28c	JLR (TRT 75) JLR & SV (TRT 79) RWJ (TRT 90)
+	*Chaenorrhinum minus* (L.) Lange	Dwarf Snapdragon	27,30d	JLR (TRT 75) JK & PC (MP 74) PC (TRT 74)
	Chelone glabra L.	Turtlehead	4,5,7-10	JLR (TRT 73)

	Species	Common Name	Community Type	Source
+	*Digitalis lanata* Ehrh.	Foxglove	30	JLR (TRT 75) JK & PC (MP 74) SV (TRT 90)
+	*Linaria vulgaris* Mill.	Toadflax, Butter-and-eggs	11,15,21,22,27-33	JLR (TRT 73) JK & PC (MP 74)
	Lindernia dubia (L.) Pennell	False Pimpernel	28c,d	JLR (TRT 73) SV & GA (TRT 88)
	Mimulus ringens L.	Square-stemmed Monkeyflower	3-5,7,27	JLR (TRT 73) JK & PC (MP 74) RWJ (TRT 90)
	Pedicularis canadensis L.	Wood-betony	15,16,21,22	JLR (TRT 75) JLR & DH (TRT 76) JK & PC (MP 74)
	Penstemon hirsutus (L.) Willd.	Beard-tongue	15,16,21,30c	JLR (TRT 73,75) JK & PC (MP 74)
	Scrophularia lanceolata Pursh	Lance-leaved Figwort	30	JK & PC (MP 74)
+	*Verbascum thapsus* L.	Common Mullein	11,12,19,22,23,27,29-33	JLR (TRT 73) JK & PC (MP 74)
	Veronica americana (Raf.) Schwein.	American Brooklime	5	SV (TRT 88)
+	*Veronica anagallis-aquatica* L.	Water-speedwell	4,5,28	JK & PC (MP 74) SV (TRT 88) SV & GA (TRT 88)
+	*Veronica arvensis* L.	Corn Speedwell	30	JK & PC (MP 74)
+	*Veronica longifolia* L.	Speedwell	30	JK & PC (MP 74) SV (TRT 88)
+	*Veronica officinalis* L.	Common Speedwell	15,16,18,21,22,24,25,32	JLR (TRT 73,75) JK & PC (MP 74)
	Veronica peregrina L. var. *peregrina* var. *xalapensis* (HBK.) St. John & Warr.	Purslane Speedwell		SV (TRT 90)
+	*Veronica serpyllifolia* L.	Thyme-leaved Speedwell	30	JK & PC (MP 74)
	OROBANCHACEAE	BROOM-RAPE FAMILY		
	Epifagus virginiana (L.) Bart.	Beech-drops	16-19,22-24	JLR (TRT 75) JK & PC (MP 74) SV & JLR (TRT 79) SV (TRT 79)

	Species	Common Name	Community Type	Source
	LENTIBULARIACEAE	BLADDERWORT FAMILY		
	Utricularia vulgaris L.	Common Bladderwort	2	JLR (TRT 73) SV (TRT 88)
	PHRYMACEAE	LOPSEED FAMILY		
	Phryma leptostachya L.	Lopseed	12-14,16-19, 23-25,32	JLR (TRT 75) SV & JLR (TRT 79) SV (TRT 79) JK & PC (MP 74)
	PLANTAGINACEAE	PLANTAIN FAMILY		
+	*Plantago lanceolata* L.	English Plantain	30	JLR (TRT 75) JK & PC (MP 74)
+	*Plantago major* L.	Broad-leaved Plantain	7,27,29,30	JLR (TRT 73) JK & PC (MP 74) SV (TRT 90)
	Plantago rugelii Dcne.	Rugel's Plantain	30	SV (TRT 90)
	RUBIACEAE	MADDER FAMILY		
	Galium aparine L.	Cleavers	7,17,23	JK & PC (MP 74)
	Galium asprellum Michx.	Rough Bedstraw	5,10-12	JK & PC (MP 74)
	Galium boreale L.	Northern Bedstraw	15,16,21,22, 30c,31,32	JLR (TRT 73) JLR & DH (TRT 76) JK & PC (MP 74) SV & KL (TRT 79) MO (TRT 80)
	Galium circaezans Michx.	Wild Licorice	16	JLR (TRT 75)
	Galium palustre L.	Marsh Bedstraw	4-7,12	JK & PC (MP 74) SV (TRT 84,89)
	Galium trifidum L. var. *trifidum*	Bedstraw	3-6	SV (TRT 88)
	Galium triflorum Michx.	Sweet-scented Bedstraw	7,8,12,13,15-19,21-25,32-34	JK (TRT 74) JLR (TRT 73) SV & JLR (TRT 79) SV (TRT 79) SV & KL (TRT 79)
+	*Galium verum* L.	Yellow Bedstraw	30	JLR (TRT 75) JK & PC (MP 74)
	Mitchella repens L.	Partridge-berry	18,19,22,25	JLR & DH (TRT 76)
	CAPRIFOLIACEAE	HONEYSUCKLE FAMILY		
	Diervilla lonicera Mill.	Bush-honeysuckle	15,16,18,19, 21,22,31-33	JLR (TRT 73) JK & PC (MP 74)

	Species	Common Name	Community Type	Source
	Lonicera canadensis Marsh.	Fly-honeysuckle	16-19,23,25,32	JK & PC (MP 74) SV (TRT 80)
	Lonicera dioica L.	Wild Honeysuckle	15-17,21,22,24, 32	JLR (TRT 73,75) JK & PC (MP 74) SV & KL (TRT 79)
	Lonicera hirsuta Eat.	Hairy Honeysuckle	22	SV (TRT 79)
+	*Lonicera morrowi* Gray		30	PC (TRT 74)
+	*Lonicera tatarica* L.	Tartarian Honeysuckle	17,22	SV (TRT 90)
+	*Lonicera xylosteum* L.		12,15,30	JLR (TRT 73,75) JK & PC (MP 74)
+	*Lonicera* X*bella* Zabel	(*L. tatarica* X *L. morrowi*)	12,15,18,23,30, 32	JK & PC (MP 74) SV & KL (TRT 79) SV (TRT 79)
	Sambucus canadensis L.	Common Elder	5-10,13,23,32	JLR (TRT 73) SV (TRT 79) JK & PC (MP 74)
	Sambucus pubens Michx.	Red-berried Elder	12-13,16-19, 22-25,32-34	JLR (TRT 73) SV (TRT 80) JK & PC (MP 74)
	Symphoricarpos albus (L.) Blake var. *albus*	Snowberry	15-17,21,22, 30c,31,32	PC (TRT 74) JK & PC (MP 74) SV & KL (TRT 79) SV (TRT 79) JLR (TRT 73)
+	var. *laevigatus* (Fern.) Blake		15,33	JLR (TRT 73)
	Viburnum acerifolium L.	Maple-leaved Viburnum	15-19,21-25, 32,33	JLR (TRT 73,75) JLR & DH (TRT 76) SV & JLR (TRT 79)
	Viburnum alnifolium Marsh.	Hobblebush	19	SV (SR 89)
+	*Viburnum lantana* L.	Wayfaring Tree, Twistwood	12	SV (TRT 89)
	Viburnum lentago L.	Nannyberry	5-8,10-12,15-17,21,32	JLR (TRT 73,75) SV & KL (TRT 79) SV (TRT 79) JK & PC (MP 74)
+	*Viburnum opulus* L.	Guelder-rose	8,12,31,32	JLR (TRT 73) JK & PC (MP 74) SV (TRT 90) GC (TRT 80) MO (TRT 80)

	Species	Common Name	Community Type	Source
	Viburnum rafinesquianum Schultes	Downy Arrow-wood	15,21	JLR & DH (TRT 76) JLR (TRT 73)
	VALERIANACEAE	VALERIAN FAMILY		
+	*Valeriana officinalis* L.	Common Valerian	5,7,12,30,32	JLR (TRT 73) JK & PC (MP 74) SV (TRT 90)
	DIPSACACEAE	TEASEL FAMILY		
+	*Dipsacus fullonum* L. (*D. sylvestris auct. amer., non* Huds.)	Teasel	5,11,30	JK & PC (MP 74)
	CUCURBITACEAE	GOURD FAMILY		
	Echinocystis lobata (Michx.) T. & G.	Wild Cucumber	5-7,11-13,15, 18,30,32	JLR (TRT 73) JK & PC (MP 74) SV (TRT 79) RWJ (TRT 90)
	CAMPANULACEAE	BLUEBELL FAMILY		
+	*Campanula rapunculoides* L.	Creeping Bellflower	30,32	JLR (TRT 73) JK & PC (MP 74)
	Campanula uliginosa Rydb.	Marsh-bellflower	4a,5a	SV (TRT 80)
	LOBELIACEAE	LOBELIA FAMILY		
	Lobelia inflata L.	Indian Tobacco	15,21	JLR (TRT 73)
	Lobelia siphilitica L.	Blue Cardinal Flower	5,10	RWJ (TRT 90) SV (SR 90)
	ASTERACEAE	ASTER FAMILY		
+	*Achillea millefolium* L.	Yarrow	5,11,15,19,27-33	JLR (TRT 73) RWJ (TRT 90)
	Ambrosia artemisiifolia L.	Common Ragweed	27-30	JLR (TRT 73) JK & PC (MP 74)
	Anaphalis margaritacea (L.) Benth.	Pearly Everlasting	15	JK & PC (MP 74)
	Antennaria neglecta Greene (incl. *A. neodioica* Greene and *A. canadensis* Greene)	Pussytoes	15,16,21,22,30	JLR (TRT 75) JK & PC (MP 74)
	Antennaria plantaginifolia (L.) Richards. (incl. *A. parlinii* Fern. and *A. munda* Fern.)	Plantain-leaved Everlasting	15,16,21,22, 30c	JLR (TRT 76) SV & KL (TRT 79)
+	*Anthemis cotula* L.	Stinking Mayweed	30	SV (TRT 90) JK & PC (MP 74)

	Species	Common Name	Community Type	Source
+	*Arctium lappa* L.	Great Burdock	30	SV (TRT 90)
+	*Arctium minus* (Hill) Bernh.	Common Burdock	12,13,18,19,23, 30-32	JLR (TRT 73) JK & PC (MP 74)
+	*Artemisia biennis* Willd.	Biennial Wormwood	30d	JLR (TRT 73) SV (TRT 90)
+	*Artemisia ludoviciana* Nutt.	Prairie Sage, Western Mugwort	5,11	JK & PC (MP 74)
	Aster azureus Lindl. (*A. oolentangiensis* Riddell)	Sky-blue Aster	15,16,21,30,31	SV (TRT 79) JLR (TRT 73,75)
+	*Aster brachyactis* Blake (*Brachyactis angustata* (Lindl.) Britt.)	Rayless Aster	30d	JLR & KL (TRT 79) JLR (TRT 75)
	Aster cordifolius L.	Heart-leaved Aster	7,12,13,15-18, 21,22,24,29,30-33	JLR (TRT 73) SV (TRT 79)
	Aster ericoides L. (*Virgulus e.* (L.) Rev. & Keen.)	Heath Aster	11,28-32	JLR (TRT 73)
	Aster lanceolatus Willd. (*A. simplex* Willd.)	Tall White Aster	5,28-30	JLR (TRT 73)
	Aster lateriflorus (L.) Britt.	One-sided Aster	5,7,12-26,31-33	JLR (TRT 73) SV (TRT 79) SV & KL (TRT 79) RWJ (TRT 90)
	Aster macrophyllus L.	Large-leaved Aster	7,15-16,18,21-22,24,32-33	JLR (TRT 73) SV (TRT 80) JK & PC (MP 74)
	Aster novae-angliae L. (*Virgulus n.* (L.) Rev. & Keen.)	New England Aster	5,11,15,27,29-32	JLR (TRT 73) PC (TRT 74) SV & KL (TRT 79)
	Aster pilosus Willd. var. *pilosus*	Aster	5c,30	SV (TRT 90)
	Aster puniceus L.	Red-stemmed Aster	5,8,10	SV (TRT 90)
	Aster umbellatus Mill.	Flat-topped White Aster	5,10,13	SV (SR 84)
	Aster Xamethystinus Nutt.	(*A. ericoides* X *A. novae-angliae*)	30	JLR & DH (TRT 76)
	Bidens cernua L.	Nodding Beggarticks	5,27,28	JLR (TRT 73,75)
	Bidens discoidea (T.& G.) Britt.	Small Beggar-ticks	5h	SV (TRT 88)
	Bidens frondosa L.	Devil's Beggarticks	5,7,8,11-13,27	SV & JLR (TRT 79) SV (TRT 90)

	Species	Common Name	Community Type	Source
	Bidens tripartita L. (incl. *B. comosa* (Gray) Wieg.)	Beggarticks	5-7,28	SV (TRT 84,88,90) SV & GA (TRT 88)
	Bidens vulgata Greene	Tall Beggarticks	5,30	SV (TRT 90)
+	*Carduus nutans* L.	Nodding Thistle	30	JLR (SR 73)
+	*Centaurea maculosa* Lam.	Spotted Knapweed	30	SV (TRT 90)
+	*Centaurea nigra* L.	Black Knapweed	30	JK & PC (MP 74)
+	*Chrysanthemum leucanthemum* L. (*Leucanthemum vulgare* Lam.)	Ox-eye Daisy	5,11,22,27-37	JLR (TRT 73) JK & PC (MP 74)
+	*Cichorium intybus* L.	Chicory	11,27-37	JLR (TRT 73) JK & PC (MP 74)
+	*Cirsium arvense* (L.) Scop.	Canada Thistle	3-5,11,12,23, 27,29-32	JLR (TRT 73) JK & PC (MP 74)
+	*Cirsium vulgare* (Savi) Tenore	Bull Thistle	12,29-32	JK & PC (MP 74)
	Conyza canadensis (L.) Cronq. (*Erigeron canadensis* L.)	Horse-weed	11,12,27-31	JLR (TRT 73)
+	*Crepis tectorum* L.	Narrow Hawk's Beard	30d	SV & PMC (TRT 80)
+	*Echinops sphaerocephalus* L.	Globe Thistle	12	SV (TRT 90)
	Erigeron annuus (L.) Pers. ssp. *annuus*	Annual Fleabane	5,11,15-16,29- 32	JLR (TRT 73) JK & PC (MP 74)
	Erigeron philadelphicus L.	Philadelphia Fleabane	5,11,15-17,19, 23,32,33	JLR (TRT 73) JK & PC (MP 74)
	Erigeron pulchellus Michx.	Robin's-plantain	15,16,19,21,22, 30,31	JK & PC (MP 74) SV & KL (TRT 79) SV (TRT 89)
	Eupatorium maculatum L.	Spotted Joe-Pye Weed	4-13,32,33	JLR (TRT 73) JK & PC (MP 74) SV (TRT 84) RWJ (TRT 90)
	Eupatorium perfoliatum L.	Boneset	4-11,13,27	JLR (TRT 73) JK & PC (MP 74) RWJ (TRT 90)
	Eupatorium rugosum Houtt.	White Snakeroot	8,12-14,16-19, 23,25,32	JLR (TRT 73) JK & PC (MP 74) SV (TRT 80)
+	*Helianthus annuus* L.	Common Sunflower	30	JK (TRT 74)
	Helianthus decapetalus L.	Thin-leaved Sunflower	16	SV (TRT 89)
	Helianthus divaricatus L.	Woodland Sunflower	15,16,21,22, 30-32	JK (TRT 74) JLR (TRT 73)

	Species	Common Name	Community Type	Source
+	*Helianthus rigidus* Desf. (*H. subrhomboideus* Rydb.; *H. laetiflorus* Pers.)		5,11,27	SV (TRT 90)
	Helianthus tuberosus L.	Jerusalem Artichoke	5,11,12,30	JLR (TRT 75) SV (TRT 90)
+	*Hieracium aurantiacum* L.	Orange Hawkweed, Devil's Paintbrush	29-31	JK & PC (MP 74) JLR (TRT 73)
+	*Hieracium caespitosum* Dum. (*H. pratense* Tausch)	Yellow Hawkweed	7,15,21,22,29-37	JLR (TRT 73) JK & PC (MP 74)
+	*Hieracium piloselloides* Vill. (*H. florentinum* All.)	King Devil Hawkweed	29-37	JK & PC (MP 74)
+	*Hieracium vulgatum* (Fries) Almquist	Common Hawkweed	30	JK & PC (MP 74)
+	*Inula helenium* L.	Elecampane	5,7,30,31	JK & PC (MP 74)
	Lactuca canadensis L.	Canada Lettuce	5,7	JLR (TRT 73) SV (TRT 88)
+	*Lactuca serriola* L. (*L. scariola* L.)	Prickly Lettuce	30d	JK (TRT 74)
+	*Lapsana communis* L.	Nipplewort	13	SV (SR 90)
+	*Matricaria matricarioides* (Less.) Porter	Pineapple Weed	29-31	JK & PC (MP 74)
	Prenanthes alba L.	White Lettuce, Rattlesnake-root	15,22	JK (TRT 74)
	Prenanthes altissima L.	Tall White Lettuce	7,10,15-19,21-25,32,33	JLR (TRT 73) SV (TRT 79,80)
	Rudbeckia hirta L. (*R. serotina* Nutt.)	Black-eyed Susan	5,11,29-32	JLR (TRT 75) JK & PC (MP 74)
	Rudbeckia laciniata L.	Cut-leaved Coneflower	30	PC (TRT 74)
+	*Rudbeckia triloba* L.	Brown-eyed Susan	30	DK (TRT 68) SV (TRT 90)
+	*Senecio vulgaris* L.	Common Groundsel	30	JLR (TRT 75)
	Solidago altissima L.	Tall Goldenrod	5,11-13,29-31	SV (TRT 90)
	Solidago arguta Ait.	Sharp-leaved Goldenrod	21	SV (SR 89)
	Solidago bicolor L.	White Goldenrod, Silverrod	30c	SV (SR 89)
	Solidago caesia L.	Blue-stem Goldenrod	12-26,31-37	JLR (TRT 73) SV & JLR (TRT 79) SV (TRT 79) RWJ (TRT 90)

	Species	Common Name	Community Type	Source
	Solidago canadensis L.	Canada Goldenrod	5,7,8,11-13,15, 21,22,28-32	JLR (TRT 73) SV (TRT 90)
	Solidago flexicaulis L.	Zig-zag Goldenrod	7-10,12-14,16- 20,22,23,25,26, 31-37	JLR (TRT 73) SV (TRT 79) JK & PC (MP 74)
	Solidago gigantea Ait. (*S. serotina* Ait. var. *gigantea* (Ait.) Gray)	Late Goldenrod	5-13,23,27,30- 33	SV (TRT 90) JK & PC (MP 74)
	Solidago graminifolia (L.) Salisb. (*Euthamia graminifolia* (L.) Nutt.)	Narrow-leaf Goldenrod	5,9,11,12,16, 27-31	SV (TRT 90)
	Solidago hispida Muhl.	Hairy Goldenrod	15,16,21,30c	SV (SR 89)
	Solidago juncea Ait.	Early Goldenrod	5,15,16,21,22, 30-32	SV (TRT 73) SV & KL (TRT 79) SV (TRT 79) JK & PC (MP 74) JLR (TRT 73)
	Solidago nemoralis Ait.	Gray Goldenrod	5,28-32	SV (TRT 73) RWJ (TRT 90)
	Solidago patula Muhl.	Rough-leaved Goldenrod	5g,10	SV (TRT 90)
+	*Sonchus arvensis* L. ssp. *arvensis*	Perennial Sow-thistle	30	JLR (TRT 73) JK & PC (MP 74)
+	*Sonchus asper* (L.) Hill	Spiny Annual Sow-thistle	30	JLR (TRT 75) SV (TRT 90) JK & PC (MP 74)
+	*Sonchus oleraceus* L.	Annual Sow-thistle	30d	JK & PC (MP 74)
+	*Tanacetum vulgare* L.	Tansy	29,30	JK & PC (MP 74)
+	*Taraxacum officinale* Weber	Dandelion	7,12-19,21-24, 26,28-33	JLR (TRT 73) SV (TRT 80) JK & PC (MP 74)
+	*Tragopogon dubius* Scop.	Goat's-beard	30	JLR (TRT 73) JK & PC (MP 74)
+	*Tragopogon pratensis* L.	Meadow Goat's-beard	30	JLR (TRT 73) JK & PC (MP 74)
+	*Tussilago farfara* L.	Sweet Coltsfoot	5,8,11-13,29,33	JLR (TRT 73) RWJ (TRT 90) JK & PC (MP 74)
	Xanthium strumarium L. (incl. var. *canadensis* (Mill.) T. & G.)	Cocklebur	5,11,27,28	JLR (TRT 73)

Other Species Occurring in the Park's Phase 2 Study Area
(Little Rouge to Pickering Townline, Steeles to Finch Avenue) (Kamstra 1991)

	Species	Common Name	Status
+	*Alopecurus pratensis* L.	Meadow Foxtail	
	Corylus americana Walt.	American hazel	Rare in site district 7-4
+	*Geum urbanum* L.	Avens	
	Polygonum pensylvanicum L.	Bigseed Smartweed	Rare in York and Metro Toronto
	Rumex verticillatus L.	Water Dock	Rare in site district 7-4
+	*Salix pentandra* L.	Bay-leaved Willow	
+	*Trifolium aureum* Poll.	Hop Clover	

Species persisting as plantings but not spreading
(This partial listing is incomplete.)

Species	Common Name	Source
Taxus cuspidatum Sieb. & Zucc.	Shrub Yew	JLR (TRT 75)
Larix decidua Mill.	European Larch	JK & PC (MP 74), SV (TRT 90)
Picea mariana (Mill.) BSP.	Black Spruce	JR (SR 90)
Picea pungens	Blue Spruce	CSWD (SR 83)
Pinus banksiana Lam.	Jack Pine	JLR (SR)
Pinus montana Mill. var. *mughus* Willk.	Mugho Pine	JLR (TRT 75)
Pinus contorta Doug.	Lodgepole Pine	JLR (TRT 74)
Pinus nigra Arnold	Austrian Pine	JK & PC (MP 74)
Pseudotsuga menziesii (Mirb.) Franco	Douglas-fir	SV (TRT 90)
Miscanthus sinensis Anderss.	Miscanthus	JLR (SR)
Tradescantia virginiana L.	Spiderwort	JLR (TRT 75) JK & PC (MP 74) SV (TRT 90)
Lilium lancefolium Thunb.	Tiger Lily	JK & PC (MP 74)
Iris germanica L.	Garden Iris	JK (TRT 74)
Populus nigra L. var. *italica* DuRoi	Lombardy Poplar	JK & PC (MP 74)
Rheum rhaponticum (L.) Bickn.	Rhubarb	JLR (TRT 73)
Dianthus barbatus L.	Sweet William	JK & PC (MP 74)
Lychnis chalcedonica L.	Scarlet Lychnis	JLR (TRT 73)
Lychnis coronaria (L.) Desr.	Rose Campion	JK & PC (MP 74)
Papaver orientale L.	Oriental Poppy	JLR (TRT 75)
Sedum spurium Bieb.		JK & PC (MP 74)

Species	**Common Name**	**Source**
Sedum telephium L.	Live-forever	JLR (TRT 73) JK & PC (MP 74)
Philadelphus coronarius L.	Mock-orange	JLR (TRT 73) JK & PC (MP 74)
Chaenomeles japonica Lindl.	Japanese Quince	PC (TRT 74)
Filipendula hexapetala Gilib.	Dropwort	JK & PC (MP 74) SV (TRT 88)
Rosa rubrifolia Vill.	European Rose	PC (TRT 74)
Spiraea X*vanhouttei* (Briot) Carr	Bridal-wreath	JLR (TRT 73) JK & PC (MP 74)
Cladrastis lutea (Michx.f.) K. Koch.	Yellow-Wood	JLR (TRT 75) JK & PC (MP 74)
Elaeagnus angustifolia L.	Russian Olive	JK & PC (MP 74)
Forsythia viridissima Lindl.	Forsythia	JLR (SR 73)
Catalpa speciosa Warder	Catalpa	JK & PC (MP 74)
Gaillardia pulchella Foug.	Blanket-Flower	PC (TRT 74)

Species needing confirmation

(Species listed in City of Scarborough (1983) which are not confirmed by vouchers and appear to be doubtful.)

Desmodium cuspidatum
Eupatorium purpureum
Galium mollugo
Geum macrophyllum
Lilium philadelphicum
Morus rubra
Pontederia cordata
Ribes lacustre
Sanicula gregaria
Ulmus thomasii
Valeriana uliginosa
Viburnum trilobum
Viola papilionacea

APPENDIX B: BIRDS OF THE ROUGE VALLEY PARK

The 1990 breeding bird surveys and the assembly of historical records resulted in a list of 225 bird species having occurred in the wild within the Rouge Valley Park. An additional 28 species have occurred within 2 km of the park. Of the 225 species, 88 have been confirmed as breeding and 17 are probable breeders. An additional 8 species may be considered possible breeders (using standard bird atlas breeding evidence criteria). The remainder have been recorded as migrants, winterers, non-breeding summer residents, and vagrants.

Relative Abundance

Regional Status (in Durham):
Abundant = More than 1001 records in the specified season
Common = 101 to 1000 records in the specified season
Uncommon = 51 to 100 records in the specified season
Scarce = 11 to 50 records in the specified season
Rare = 1 to 10 records in the specified season

Seasons:
Spring = March 1 to May 31
Summer = June 1 to July 31
Autumn = August 1 to November 30
Winter = December 1 to February 29

Status within the Rouge Valley Park (during breeding season):
Abundant = More than 15 birds per 10 km of walking
Common = 6 to 15 birds per 10 km of walking
Fairly common = 3 to 6 birds per 10 km of walking
Uncommon = 1 to 2 birds per 10 km of walking
Rare = less than 1 bird per 10 km of walking

Symbols:
(C) Confirmed breeding species at the Rouge
(P) Probable breeding species at the Rouge
** Nationally, provincially or regionally significant breeding or potential breeding species or species of concern (see Chapter II.iv for more details)
* Locally significant breeding or potential breeding species

Species Recorded Within the Proposed Park Boundaries

Common Loon *Gavia immer*

Abundant in spring and common during fall migration in the region, rare in winter on Lake Ontario, and an uncommon non-breeding summer resident near the mouth of the Rouge.

Pied-billed Grebe *Podilymbus podiceps*

An uncommon migrant and declining breeder in the region which "has summered" (Speirs, pers. comm.) at the lower Rouge River marsh.

Great Cormorant *Phalacrocorax carbo*
Hypothetical and accidental. An individual was shot in 1888 at the mouth of the Rouge, but misidentification has been suspected (Bio. Rev. of Ont. 1:236).

Double-crested Cormorant ** *Phalacrocorax auritus*
A regionally rare species (Riley and Gould 1989), described as "an increasingly common migrant" (Bain & Henshaw 1990) in the region, which is an occasional summer visitor at the mouth of the Rouge.

American Bittern (C) * *Botaurus lentiginosus*
A regionally scarce migrant and uncommon breeder in marshes, swamps, willow and alder thickets and wet fields (Bucknell 1987), and a former rare breeding species in the lower Rouge River marsh (Wainio *et al.* 1973a).

Least Bittern (C) * *Ixobrychus exilis*
This species of concern (Cadman 1990) is a scarce migrant and breeder in the region's dense cattail marshes (Woodliffe 1987), and a rare but regular breeder in the lower Rouge River marsh (Wainio *et al.* 1973a; present study).

Great Blue Heron * *Ardea herodias*
A declining and vulnerable species (Blue-listed, Tate 1986), which is nevertheless a common migrant and uncommon summer resident at the marshes, ponds and rivers of the Rouge. A small heronry of six or seven pairs is located within one kilometre of the Park boundary. A few sometimes linger in winter until freeze-up (T.F.N.C.N. F'80).

Great Egret ** *Casmerodius albus*
An occasional spring and autumn visitor. "A pair may have bred ... regularly for many years" at the lower Rouge River marsh in the late 1800s (Speirs 1979). This is a provincial species of concern (Cadman 1990).

Cattle Egret ** *Bubulcus ibis*
This rare spring through autumn straggler and occasional breeder in Ontario has visited the Metro Zoo grounds (Fairchild, pers. comm.).

Green-backed Heron (C) *Butorides striatus*
Considered a scarce migrant and an uncommon breeder in the region; this is an uncommon breeding resident in the lower Rouge River marsh, and an uncommon but regular summer visitor along the inland streams, rivers and ponds of the interior. A likely breeding colony of several pairs is located approximately one kilometre from the park boundary.

Black-crowned Night-Heron ** *Nycticorax nycticorax*
A common migrant and summer resident in the region, but a species which is considered a provincial species of concern (Cadman 1990). It is a common nonbreeding summer visitor to the lower Rouge River marsh and along the Rouge River, and there is one breeding record for the lower marsh (Connell and Norman 1988). There is an early winter record within two kilometres of the park boundary (Speirs, pers. comm.).

Yellow-crowned Night-Heron ** *Nyctanassa violacea*
An extremely rare autumn straggler. One was seen at the lower Rouge River marsh on September 13, 1964 (Speirs, Ont. Nat. 3(1):34).

Trumpeter Swan *Cygnus buccinator*
Introduced. An individual was present at the mouth of the Rouge River in 1989 (Speirs, pers. comm.).

Mute Swan (C) *Cygnus olor*
A scarce and local breeding resident in cattail marshes of the region, with some post-breeding season movement along the Lake (Lumsden 1987). This is a conspicuous but uncommon breeding resident in the lower Rouge River marsh. Two pairs were present in 1990, and two fledged young were observed.

Greater White-fronted Goose *Anser albifrons*
Hypothetical. An individual was seen at the Rouge River on January 19, 1980 (T.F.N.C.N. Apr '80).

Snow Goose *Chen caerulescens*
Hypothetical. A rare spring and scarce fall migrant in the region. This species was observed at the Rouge River on May 4, 1980 (T.F.N.C.N. S'80).

Brant *Branta bernicla*
A rare migrant on Lake Ontario, occasionally seen from the mouth of the Rouge River (Fairchild, pers. comm.).

Canada Goose (C) *Branta canadensis*
An abundant breeding year-round resident and migrant, found along all larger bodies of water in the Rouge Valley Park, with a 1990 June population of more than 150 adult birds in the lower Rouge River marsh.

Wood Duck (C) *Aix sponsa*
A locally common breeding species at the lower Rouge River marsh and in the woodland ponds of the interior.

Green-winged Teal *Anas crecca*
A common migrant, with "fair numbers" using the lower Rouge River marsh, particularly in low-water years (Speirs, pers. comm.). Some linger into early winter (T.F.N.C.N. F'80).

American Black Duck (P) *Anas rubipres*
A declining species due to introgression with Mallard (Riley & Gould 1989), which may still breed in the lower Rouge River marsh, and along interior streams and ponds. Mallard X Black hybrids are occasionally seen during breeding season in the Rouge Valley Park. It is a regionally common migrant, locally common in winter.

Mallard (C) *Anas platyrhynchos*
An abundant migrant and summer resident, breeding wherever there is permanent water in the Rouge Valley Park. It is abundant in winter in the region. In 1973, 38 nests were recorded in the lakeshore marshes, with 181 eggs or young in the nests (Wainio *et al.* 1973a).

Northern Pintail *Anas acuta*
This fairly common but decreasing migrant and rare winterer in the region is considered uncommon and local as a breeder in southern Ontario (Riley and Gould 1989). It has been regular at the Metro Zoo in winter (Harpley 1990).

Blue-winged Teal (C) *Anas discors*
A regionally abundant migrant and uncommon summer resident, breeding in the lower Rouge River marsh and possibly at interior open-country ponds.

Northern Shoveler ** *Anas clypeata*
"Occurs in migration" and "a few may linger" at the lower Rouge River marsh (Speirs, pers. comm.). This species is uncommon to rare at all seasons in the region.

Gadwall *Anas strepera*
An uncommon spring migrant, but large numbers (up to 100) congregate at the mouth of the Rouge River in the fall, remaining there until freeze-up (Speirs, pers. comm.).

American Wigeon ** *Anas americana*
A decreasing and formerly common migrant in the region, with "a few" occurring with the autumn flocks of Gadwall at the mouth of the Rouge River (Speirs, pers. comm.).

Canvasback ** *Aythya valisinaria*
This uncommon migrant and rare winterer in the region has occurred at the mouth of the Rouge River in early spring (P.N.F. 1984).

Redhead ** *Aythya americana*
This uncommon migrant and winterer has occurred on Lake Ontario just east of the mouth of the Rouge River in winter (P.N.F. 1984).

Ring-necked Duck *Aythya collaris*
"10 to 20 occur in migration, especially in April" at the mouth of the Rouge (Speirs, pers. comm.). This species has also been sighted at interior ponds (City of Scarborough 1983).

Greater Scaup *Aythya marila*
This regionally abundant migrant and common winterer has occurred at the mouth of the Rouge River in spring (Barker, pers. comm.).

Lesser Scaup ** *Aythya affinis*
This abundant spring and common fall migrant and rare visitor at other seasons to the region, has been observed at the mouth of the Rouge River in fall (Speirs, pers. comm.).

Harlequin Duck *Histrionicus histrionicus*
A rare fall, winter and spring visitor on Lake Ontario. One was seen in the 1970s just east of the mouth of the Rouge (Speirs, pers. comm.), and during the winter of 1980-1 at the same location (P.N.F., several obs.).

Oldsquaw *Clangula hyemalis*
This abundant winterer and migrant, and occasional year-round lingerer along the Toronto waterfront is not commonly seen near the Rouge (Speirs, pers. comm.). However, summering individuals were seen in July, 1990 from the mouth of the Rouge River.

White-winged Scoter *Melanitta fusca*
This abundant spring migrant on Lake Ontario has been seen at the mouth of the Rouge River (Speirs, pers. comm.). At other seasons it is regionally uncommon to rare.

Common Goldeneye *Bucephala clangula*
A common migrant and winterer which can be seen an Lake Ontario at the mouth of the Rouge (T.F.N.C.N. F'80).

Bufflehead *Bucephala albeola*
Common at the mouth of the Rouge River in winter and in migration (Speirs, pers. comm.).

Hooded Merganser *Lophodytes cucculatus*
This regionally common migrant, rare winterer and rare breeder has occurred in late fall at the mouth of the Rouge River (P.N.F. 1984).

Common Merganser ** *Mergus merganser*
An abundant migrant and a common winterer on Lake Ontario, often seen from the mouth of the Rouge (Speirs, pers. comm.).

Red-breasted Merganser ** *Mergus serrator*
An abundant migrant and uncommon winterer on Lake Ontario, observable from the mouth of the Rouge (Speirs, pers. comm.).

Ruddy Duck *Oxyura jamaicensis*
An uncommon migrant in the region, with "one or two" usually occurring in the lower Rouge River marsh in spring and fall (Speirs, pers. comm.).

Turkey Vulture *Cathartes aura*
A common migrant through the Rouge in the fall (Robb, pers. comm.), regionally less common in the spring.

Osprey * *Pandion haliaetus*
An uncommon migrant in the region, and a rare but regular summer visitor to the upper sections of the Rouge River and Little Rouge Creek (Harpley, pers. comm.).

Bald Eagle ** *Haliaetus leucocephalus*
A rare year-round visitor and migrant in the region, occasionally seen both at the lower Rouge River marsh (Robb, pers. comm.) and along the Rouge River (Harpley, pers. comm.). This is a provincially endangered species.

Northern Harrier (C) *Circus cyaneus*
A common migrant and uncommon breeder in the region, occasionally seen hunting during summer over the tableland fields of the Rouge, where it has nested (City of Scarborough 1983).

Sharp-shinned Hawk (P) * *Accipiter striatus*
A scarce winterer and scarce spring migrant in the region, but an often abundant fall migrant (Robb, pers. comm.) which has undoubtedly bred in conifer stands of the Rouge Valley Park, as there are several breeding season observations (Robb, Harpley, pers. comm.).

Cooper's Hawk (C) ** *Accipiter cooperii*
This is a species of concern (Cadman 1990), considered nationally and provincially rare (Penak 1981). In the region, it is a scarce but recovering species of deciduous and mixed woods, often hunting in open country, and has returned as a rare breeding species to the Rouge Valley Park. It is considered scarce in the region in winter and spring, and uncommon in fall migration.

Red-shouldered Hawk (C) ** *Buteo lineatus*
Formerly a fairly common breeder in the beech-maple-hemlock forests of the Rouge (and the rest of southern Ontario). It is now apparently extirpated from the Rouge, although a pair likely breeds within 3 kilometres of the park boundary (Leonard, Speirs, pers. comm.). This provincially rare species (Risley 1982) is an uncommon migrant and rare winterer in the region.

Broad-winged Hawk *Buteo platypterus*
An uncommon spring migrant, and fairly common autumn migrant through the region, occasionally occurring in large 'kettles' over the Rouge.

Red-tailed Hawk (C) *Buteo jamaicensis*
A common breeding resident of sparser forests and woodlots, found throughout the year perched or soaring over the Rouge's fields.

Rough-legged Hawk *Buteo lagopus*
This irregular and uncommon winterer and migrant in the region has occurred in the open country of the northern sections of the park in winter (Fairchild, pers. comm) and undoubtedly along the Lake in migration.

Golden Eagle *Aquila chrysaetos*
A very rare bird at any season, most likely to occur in the fall. A Golden Eagle visited the Finch Meander area during the winter of 1981 (Harpley, pers. comm.). It is a provincially endangered species.

American Kestrel (C) *Falco sparverius*
A common migrant and uncommon winterer in the region. The American Kestrel is an uncommon breeding species in the open country of the Rouge, requiring trees with cavities of suitable size for nesting, although a pair once nested in an abandoned house near Kirkhams Road (O.N.R.S. 1966).

Peregrine Falcon ** *Falco peregrinus*
A rare migrant, more likely to be expected in autumn. Peregrines have passed through the Rouge in migration (Speirs 1977; Robb, pers. comm.). It is a provincially endangered species.

Ring-necked Pheasant (C) *Phasianus colchicus*
An uncommon introduced species in the region, but a fairly common breeder and year-round resident in the fields of the northern sections of the Rouge Valley Park.

Ruffed Grouse (C) *Bonasa umbellus*
A widespread and fairly common but somewhat secretive year-round resident and breeding species in coniferous and mixed mid-succession forests north of the 401. It is considered "exceptional" (Goodwin 1988) to find this species within urban areas.

Sandhill Crane *Grus canadensis*
An individual of this species spent the winter of 1979-80 feeding at an open pond at the Metro Zoo - an exceptional event. This species is only very rarely seen in the region during migration.

Virginia Rail (P) * *Rallus limicola*
A common breeding resident of the lower Rouge River marsh. In the region it is an uncommon migrant, and, though wintering attempts are exceptional, it has been found during that season at the Metro Zoo (Fairchild, pers. comm.).

Sora *Porzana carolina*
An uncommon migrant and a fairly common breeder in the region's marshes. Surprisingly, there appear to be no records of this relatively common rail breeding in the lower Rouge River marsh, although there are several records for neighbouring marshes.

Purple Gallinule *Porphyrula martinica*
Accidental. A specimen was collected at the mouth of the Rouge River on April 3, 1892 (Speirs 1977).

Common Moorhen (C) *Gallinula chloropus*
A formerly abundant breeding species in the lower Rouge River marsh (Wainio *et al.* 1973a), now uncommon. In 1973, 62 nests were recorded, with 331 eggs or young in the nest.

American Coot (C) ** *Fulica americana*
A formerly uncommon breeding species in the lower Rouge River marsh (Wainio *et al.* 1973a), this species of concern (Cadman 1990) is now apparently absent. There are fall records to 1986 (T.F.N. 1984; Speirs, pers. comm.).

Killdeer (C) *Charadrius vociferus*
An abundant migrant in the region, and a common breeder in the lower Rouge River marsh and in open areas with minimal vegetation in the upper sections of the Rouge Valley Park.

Greater Yellowlegs *Tringa melanoleuca*
Uncommon during spring and common in fall migration in the region, seen occasionally along the watercourses of the Rouge.

Lesser Yellowlegs *Tringa flavipes*
A common migrant in the region, frequenting the lower Rouge River marsh and other wet areas of the Rouge in small numbers.

Willet *Calaptrophorus semipalmatus*
Hypothetical. An injured individual of this rare spring through autumn visitor to the region was seen on October 30, 1984 at the mouth of the Rouge River (T.F.N. Feb. 1985).

Solitary Sandpiper *Tringa solitaria*
A fairly common migrant, found at puddles, ponds, rivers and marshes of the Rouge.

Spotted Sandpiper (C) *Actitis macularia*
A common migrant in the region, and a conspicuous and common breeding species in the Rouge Valley Park, found along the Rouge River and the Little Rouge Creek and in nearby sparsely vegetated fields.

Hudsonian Godwit *Limosa haemastica*
This scarce fall migrant in the region has been recorded at the mouth of the Rouge River (P.N.F. 1984).

Semipalmated Sandpiper *Calidris pusilla*
This common migrant through the region has been seen at the lower Rouge River marsh (Speirs, pers. comm.).

Least Sandpiper *Calidris minutilla*
This regionally common migrant has occurred at the mouth of the Rouge River (P.N.F. 1984).

White-rumped Sandpiper *Calidris fuscicollis*
This scarce spring and common fall migrant in the region has occurred in fall at the mouth of the Rouge River (Speirs, pers. comm.).

Baird's Sandpiper *Calidris bairdii*
This rare spring to scarce autumn migrant in the region has occurred at the Metro Zoo (Fairchild, pers. comm.) and at the mouth of the Rouge River (Speirs, pers. comm.).

Pectoral Sandpiper *Calidris melanotos*
This scarce spring and common fall migrant in the region occurs in migration at the lower Rouge River marsh (Speirs, pers. comm.).

Dunlin *Calidris alpina*
This regionally common migrant and vagrant at other seasons occurs during migration at the lower Rouge River marsh (Speirs, pers. comm.).

Common Snipe *Gallinago gallinago*
This regionally common migrant and breeding species has been recorded within the park (P.N.F. 1984), and has bred as close to the park as Rosebank Rd. (Speirs 1977). It should be expected at the Rouge's marshes, wet fields, ditches and grassy ponds.

American Woodcock (C) *Scolopax minor*
This regionally common migrant and summer resident breeds near wooded areas in the wetter fields and meadows of the Rouge. Its elaborate courtship displays can be heard, if not seen, near the Reesor Woods on spring evenings.

Wilson's Phalarope ** *Phalaropus tricolor*

This scarce migrant and rare summer breeder in the region has been recorded in autumn at the mouth of the Rouge River (P.N.F. 1984).

Franklin's Gull *Larus pipixcan*

This very rare fall visitor to the region has been observed at the mouth of the Rouge River (Speirs 1974).

Ring-billed Gull (C) *Larus delawarensis*

From early spring through to early winter, abundant numbers of this enterprising species frequent the mouth of the Rouge River and can be observed flying over other sections of the park on their way to feed in cultivated fields and wherever there is garbage. Smaller numbers winter on Lake Ontario. This species is also reported to have bred at the Metro Zoo (Fairchild, pers. comm.).

Herring Gull *Larus argentatus*

This abundant gull becomes less common during breeding season, although nonbreeding birds can often be seen at the mouth of the Rouge River in summer. It is usually the most common gull along Lake Ontario in the winter.

Iceland Gull *Larus glaucoides*

For this regionally scarce species there are winter records (T.F.N.C.N. F'80, F'85) for the mouth of the Rouge River and for the Beare Road landfill when it was in use.

Lesser Black-backed Gull *Larus fuscus*

This rare migrant and winterer has been recorded at the mouth of the Rouge River (Bain and Henshaw 1990), and at the Beare Road landfill when it was in use (pers. obs.).

Glaucous Gull *Larus hyperboreus*

This regionally scarce winter resident has been recorded at the mouth of the Rouge River (Speirs 1974).

Great Black-backed Gull ** *Larus marinus*

This uncommon species may be seen quite often at the mouth of the Rouge River throughout the year, although numbers tend to diminish after migration periods. Summer visitors are nonbreeding, usually juvenile birds.

Caspian Tern ** *Sterna caspia*

Described as an uncommon spring and common autumn migrant in the region, individuals of this provincial species of concern (Cadman 1990) occur occasionally along Lake Ontario at the mouth of the Rouge in summer. They are likely breeding residents of the colony at Thommy Tompson park.

Common Tern * *Sterna hirundo*

This regionally common migrant and scarce breeder often uses the lower Rouge River marsh and adjacent Lake Ontario to feed. During the breeding season of 1990, individuals were observed carrying food away from the marsh, probably to nesting colonies elsewhere.

Black Tern (C) ** *Chlidonias niger*

This species was formerly a common breeder in the cattail marshes of Southern Ontario, and was a very common breeding species in the lower Rouge River marsh (35 nests, 78 eggs or young in nests; Wainio *et al.* 1973a). It is now considered a threatened species in Canada. Sensitive to changes in water quality and vegetation density, it has all but vanished as a breeding species in the marsh, with one failed nesting attempt in 1990. A few individuals were observed that year, however, regularly carrying food out of the marsh, probably to colonies elsewhere.

Rock Dove (C) *Columba livia*
Flocks of this regionally abundant resident of urban and farm settings can be seen passing over the park year round, feeding in cultivated fields, and nesting under bridges and around buildings.

Mourning Dove (C) *Zenaida macroura*
An abundant year-round resident and migrant in the region, with individuals and flocks often seen in the fields, orchards and open woodland of the Rouge Valley Park.

Black-billed Cuckoo (C) * *Coccyzus erythropthalmus*
This secretive species is actually a fairly common and widespread breeder (O.N.R.S. 1966; present study) in the Rouge Valley Park, preferring hawthorn patches, old orchards and forest-edges for nesting.

Yellow-billed Cuckoo * *Coccyzus americanus*
There are a number of nesting records for the periphery of the park (Speirs 1976; O.N.R.S. 1942), and breeding season sightings within the park (Fairchild, pers. comm.; City of Scarborough 1983). This regionally scarce species should be expected as a breeding bird in similar habitat as the Black-billed Cuckoo.

Eastern Screech-Owl (P) *Otus asio*
Considered an uncommon permanent resident in the region, this species was found to be fairly widespread in the Rouge Valley Park as a probable breeding species in 1990. Although the species can be found in a wide variety of habitats near water, from orchards, parks and gardens to wooded swamps and mature deciduous and mixed forests, the Rouge's Screech-Owls were invariably found in mature Red Oak-Sugar Maple stands where there was an abundance of Pileated Woodpecker holes. Nesting has been confirmed within two kilometres of the park boundary (O.N.R.S. 1966).

Great Horned Owl (C) *Bubo virginianus*
Vying with the Red-tailed Hawk for status as the most common raptor in the Rouge, this permanent resident and breeding species was found throughout the park in deciduous and mixed forests and woodlots.

Snowy Owl *Nyctea scandiaca*
This regionally rare winter visitor from the arctic has been observed near the mouth of the Rouge (Speirs 1976).

Barred Owl * *Strix varia*
This is a regionally rare winter visitor and occasional breeder which has been found in winter within the park boundaries (Garrett, pers. comm.). It is a species of extensive, dense moist forests (Weir 1987), and has probably bred nearby in Pickering (Speirs, pers. comm.).

Great Gray Owl *Strix nebulosa*
An occasional and irruptive winter visitor to the Toronto region (Goodwin 1988), this provincially rare species has been seen within the Rouge Valley Park area during incursion years (Fairchild, pers. comm.).

Long-eared Owl ** *Asio otus*
This species of concern (Cadman 1990) may be expected to occur in conifers or other dense vegetation of the Rouge Valley Park at any season. There are winter records for the park (Fairchild, pers. comm.), and several breeding records for surrounding areas (O.N.R.S.; Speirs, pers. comm.).

Short-eared Owl ** *Asio flammeus*
This scarce visitor to the area, a provincial species of concern (Cadman 1990), has been recorded within the park boundaries in winter (Fairchild, pers. comm.).

Northern Saw-whet Owl * *Aegolius acadicus*
This regionally rare to scarce species in migration and winter has occurred in the park (Robb, pers. comm.) during spring, and may have bred in 1973 within three kilometres of the Rouge (Speirs 1976).

Common Nighthawk *Chordeiles minor*
A common breeding species in the region, this species was found to be rather uncommon in the park in 1990, most often observed hunting insects in the evening over the lower Rouge River marsh. It is considered an uncommon migrant in the region.

Whip-poor-will * *Caprimulgus vociferus*
This is considered a scarce migrant in the region and a common breeding species in open woods with clearings (Mills 1987) along the Oak Ridges Moraine (Bain and Henshaw 1990). It formerly nested within Metropolitan Toronto (Baillie and Harrington 1936; O.N.R.S.), and has been observed in spring within the Rouge Valley Park.

Chimney Swift (P) *Chaetura pelagica*
This regionally common migrant and breeder is a fairly common summer visitor in the park, mainly over the lower Rouge River marsh. It probably nests in unused chimneys or tree cavities nearby.

Ruby-throated Hummingbird (C) *Archilochus colubris*
An uncommon spring and common fall migrant in the region, this species is an inconspicuous and uncommon breeder in the Rouge Valley Park. It frequents a variety of habitats, from extensive mixed forests to suburban gardens, but prefers the forest edge for nesting (Biro 1987).

Belted Kingfisher (C) *Ceryle alcyon*
This is one of the most striking and conspicuous species to be seen along the Rouge River and Little Rouge Creek as long as they are not ice-covered. It is a common breeder, excavating its nest in the isolated sandy riverbanks and bluffs of the park.

Red-headed Woodpecker (C) *Melanerpes erythrocephalus*
This was formerly an uncommon but regular summer resident and confirmed breeder (City of Scarborough 1983) in the woodlots, roadsides and abandoned orchards of the northern sections of the park (Fairchild, Harpley, pers. comm.) It has now apparently disappeared as a breeder, and was only a rare migrant in 1990 possibly due to urban encroachment.

Red-bellied Woodpecker ** *Melanerpes carolinus*
This provincial species of concern (Cadman 1990) is currently increasing in numbers (Woodliffe 1987) and individuals have spent several winters during the past three decades visiting backyard feeders at the fringes of the Rouge Valley Park.

Yellow-bellied Sapsucker (C) * *Sphyrapicus varius*
This common migrant is an uncommon breeding species in the region and has rarely bred in the Rouge (City of Scarborough 1983). It prefers living poplars for nesting, and feeds on the sap of birches, hemlocks and a variety of other mixed tree species including apple (Biro 1987), requirements that certainly are met in the park.

Downy Woodpecker (C) *Picoides pubescens*
This is a common breeding year-round resident of woodlands throughout the Rouge Valley Park.

Hairy Woodpecker (C) *Picoides villosus*
This is a somewhat less common resident breeding species of the park than the Downy, and is confined to the more heavily forested sections.

Black-backed Woodpecker *Picoides arcticus*
This rare winter visitor to the region has been recorded in a conifer stand near the Metro Zoo (Fairchild, pers. comm.).

Northern Flicker (C) *Colaptes auratus*
This common migrant and breeding species is found in a variety of wooded and more open habitats in the Rouge. It is a rare winterer in the region.

Pileated Woodpecker (C) *Dryocopus pileatus*
This is an uncommon but widespread permanent resident of the Rouge, found in the more heavily wooded areas throughout the park.

Olive-sided Flycatcher *Contopus borealis*
This is a scarce migrant in the region. A few should be expected through the Rouge during migration periods.

Eastern Wood-pewee (C) *Contopus virens*
This is a common migrant and a very common breeder at the Rouge, found in deciduous and mixed woods.

Yellow-bellied Flycatcher *Empidonax flaviventris*
This scarce spring and rare autumn migrant in the region has occurred in spring at the Rouge (Fairchild, pers. comm.).

Alder Flycatcher (C) *Empidonax ainorum*
This common migrant and breeder in the region is an uncommon and local breeder at the Rouge. One breeding pair was found in 1990. Like the Willow Flycatcher, this species is known to nest in both willows and alders, but often in wetter situations than its almost identical cousin (Prescott 1987).

Willow Flycatcher (P) *Empidonax traillii*
This common migrant and breeder is far more common in the Rouge Valley Park than the very similar Alder Flycatcher. It is nevertheless somewhat local, and is quite abundant in the shrubby regenerating fields between Sewells and Reesor Roads, although breeding pairs are scattered elsewhere in suitable habitat in the park.

Least Flycatcher (C) *Empidonax minimus*
This species is a very common migrant, but a rather local and uncommon breeder at the Rouge. During breeding season it is found in open deciduous woods and edge habitats (Fraser 1987).

Eastern Phoebe (C) *Sayornis phoebe*
A common migrant and a locally common breeder along the Rouge River and Little Rouge Creek. An individual in 1990 was observed using a traditional cliff overhang as a nest site (Taylor, pers. obs.), instead of the bridges and eaves often occupied by more modernly-inclined phoebes. It has occurred in winter (Harpley, pers. comm.).

Great Crested Flycatcher (C) *Myiarchus crinitus*
A common migrant and very common breeder in the deciduous and mixed forests of the Rouge. It appears able to adapt to smaller woodlots and pioneering woods, if it can find cavities suitable for nesting (Bennett 1987).

Eastern Kingbird (C) *Tyrannus tyrannus*
A common migrant and a common and conspicuous breeding species of edge habitats in the Rouge Valley Park.

Horned Lark (P) *Eremophila alpestris*
A common migrant and breeding species and an uncommon winterer in the region. This species is fairly common in the cultivated and the sparsely vegetated regenerating fields of the northern sections of the park.

Purple Martin *Progne subis*
Described as an uncommon migrant and a common breeding species In the region, this species has bred in martin houses at Port Union (O.N.R.S. 1982) and the Scarborough side of the Pickering Town Line (O.N.R.S. 1972). It was, however, a rare species at the Park during the 1990 breeding season.

Tree Swallow (C) *Tachycineta bicolor*
This abundant migrant and common breeding species in the region is only locally common breeder in the Rouge Valley Park, possibly due to competition with European Starlings for nest cavities.

Northern Rough-winged Swallow (C) *Stelgidopteryx serripennis*
This regionally common migrant and breeding species is a common breeder in the park, nesting in holes in the banks of the Rouge River and Little Rouge Creek. It is somewhat colonial, although some sites appeared to contain a single pair and others were among more numerous Bank Swallow nests.

Bank Swallow (C) *Riparia riparia*
This regionally abundant migrant and breeder is one of the most common and conspicuous species in the open country of the Rouge. The largest colony, located on a severely eroded bluff at the Finch Meander, contained at least 135 pairs and approximately 650 active and inactive nest holes.

Cliff Swallow (C) * *Hirundo pyrrhonota*
This species is considered regionally uncommon and local both as a migrant and as a breeder. The colony at the footbridge at the mouth of the Rouge remains productive, although down in numbers from past years, with at least 20 pairs competing with House Sparrows for sites in 1990. Summer sightings in recent years suggest the possibility of another small colony somewhere near the northern section of the park (City of Scarborough 1983; pers. obs.).

Barn Swallow (C) *Hirundo rustica*
This common breeding species and abundant migrant in the region is common in the Rouge's open country where manmade structures suitable for nest-building are found.

Blue Jay (C) *Cyanocitta cristata*
This adaptable bird is abundant year round in the Rouge's woodlands and edges, as a breeder, migrant and wintering species.

American Crow (C) *Corvus brachyrhynchos*
This common to abundant year round resident and migrant in the region is a common breeding species at the Rouge, frequenting a variety of habitats from woodlots and forest edges to open fields and residential areas.

Common Raven *Corvus corax*
This rare fall and winter visitor to the region has occurred at the lakeshore near the mouth of the Rouge (Toronto Birdfinding Bulletin 1:22:1).

Black-capped Chickadee (C) *Parus atricapillus*
This is an abundant year-round resident and breeder in the woodlands and edge-habitats of the region, including the Rouge.

Red-breasted Nuthatch (C) *Sitta canadensis*
This is an irregular and "usually uncommon" (Bain and Henshaw 1990) migrant, scarce breeder and uncommon winterer in the region. At the Rouge, it was an uncommon but surprisingly widespread breeder in conifer stands and plantations during the 1990 study.

White-breasted Nuthatch (C) *Sitta carolinensis*
This migrant and year-round resident is considered common in the region (Bain and Henshaw 1990; Goodwin 1988), but "rare" as a breeder within Metropolitan Toronto (City of Scarborough 1983). Within the proposed boundaries of the Rouge Valley Park it was fairly common breeder in the deciduous and mixed forests.

Brown Creeper (P) * *Certhia americana*
This regionally common migrant, scarce winterer and uncom[illegible]eeder is a rare probable breeding species within the proposed park boundaries. In mid-June 1990, a pair was observed in the Crack Willow-Manitoba Maple bottomland forests at the edge of the lower Rouge River marsh.

Carolina Wren ** *Thryothorus ludovicianus*
This rare breeder and year-round resident is a provincial species of concern (Cadman 1990). In the region, it has occurred in winter (P.N.F. 1987) at feeders in the residential areas bordering the lower Rouge River marsh. Two individuals appeared in this area on August 2, 1990. These may have been dispersing birds from a confirmed (Speirs, Fairchild, pers. comm.) breeding site nearby at Colonel Danforth Trail.

House Wren (C) *Troglodytes aedon*
This regionally common migrant and breeder is a common breeding species in open mixed and deciduous woods and edge habitats throughout the park.

Winter Wren (C) * *Troglodytes troglodytes*
This regionally common migrant, uncommon breeder and rare winterer in the region is an uncommon and local breeder in the mesic mixed hemlock forests of the valley slopes of both the Rouge River and Little Rouge Creek.

Marsh Wren (C) * *Cisiothorus palustris*
This uncommon migrant and breeder in the cattail marshes of the region is a former uncommon breeder at the lower Rouge River marsh (Wainio *et al.* 1973a). No individuals were observed in 1990, but it should be looked for in the future.

Golden-crowned Kinglet *Regulus satrapa*
This common to abundant migrant, scarce summerer and uncommon winterer in the region occurs in migration at the proposed Rouge Valley Park. It occasionally occurs in winter (Harpley 1990).

Ruby-crowned Kinglet *Regulus calendula*
This abundant migrant and rare breeder in the region is common in migration throughout the Rouge valley.

Blue-gray Gnatcatcher (C) * *Polioptila caerulea*
This scarce migrant and rare breeding species is at its northern range limit in the region. It is an uncommon but regular breeder within the Rouge Valley Park, where it prefers the bottomland deciduous forests of Crack Willow and Manitoba Maple.

Eastern Bluebird * *Sialia sialis*
This uncommon migrant and uncommon breeding species in the region has been observed in migration within the park boundaries (Fairchild, pers. comm.). With the erection of nest boxes, this provincially rare species might return to the park area as a breeder, since suitable habitat (abandoned orchards, hedgerows, grassy fields) exists throughout the northern sections.

Veery (C) *Catharus fuscescens*
This is a common migrant and breeding species in the region. It is a fairly common breeder in the deciduous and mixed forests and the larger woodlots of the proposed Rouge Valley Park.

Gray-cheeked Thrush *Catharus minimus*
This scarce migrant in the region has been recorded within the park's boundaries in migration (Fairchild, pers. comm.).

Swainson's Thrush *Catharus ustulatus*
This is a common migrant in the region and in the woodlands and edge habitats of the Rouge.

Hermit Thrush *Catharus guttatus*
This abundant migrant, rare breeder and rare winterer in the region passes through the Rouge in numbers during migration. There is a winter record for the Metro Zoo (Harpley 1990).

Wood Thrush (C) *Hylocichla mustelina*
This regionally common migrant and breeding species is a common breeder in the deciduous and mixed forests and woodlots of the Rouge Valley Park.

American Robin (C) *Turdus migratorius*
This familiar and abundant migrant and breeding species and uncommon winterer is an abundant breeder at the Rouge. It prefers open deciduous and mixed forests and woodlots, as well as orchards, fields and residential gardens for breeding. There are winter records for the Metro Zoo (Harpley 1990).

Gray Catbird (C) *Dumetella carolinensis*
This common migrant and breeding species in the region is a common breeder in the shrubbery of edge habitats, hedgerows and open woods of the Rouge.

Northern Mockingbird * *Mimus polyglottos*
This southern mimic is scarce at any season in the region and rarer in summer, though it has bred in Pickering (O.N.R.S. 1957). An individual was observed on July 16, 1990 in suitable breeding habitat near the Finch Meander, but this may have been a post-breeding, dispersing bird.

Brown Thrasher (C) *Toxostoma rufum*
This common migrant and breeding species in the region is an uncommon and local breeder within the park boundaries. It prefers early successional habitats with dense shrubbery or hawthorns for nesting (Curry 1987), and was thus more common in the northern sections during the 1990 study.

American Pipit *Anthus rubescens*
This scarce spring and abundant fall migrant in the region has occurred at the mouth of the Rouge in migration (pers. obs.), and there is one Christmas count record (Speirs, pers. comm.).

Cedar Waxwing (C) *Bombycilla cedrorum*
This is a common species year-round in the region, though its numbers may fluctuate considerably from month to month, especially in winter. At the Rouge it was abundant during the 1990 breeding season, frequenting edge habitats, hedgerows, open mixed and coniferous woods, most often near fruit or berry bearing trees and shrubs.

Northern Shrike *Lanius excubitor*
This regionally uncommon migrant and winterer has been recorded in winter at the Metro Zoo (Harpley 1990) and elsewhere within the park boundaries (Fairchild, pers. comm.).

Loggerhead Shrike (C) * *Lanius ludovicianus*
This nationally threatened rare migrant and former breeder in the region once bred along the northwestern border of the park (O.N.R.S. 1966).

European Starling (C) *Sturnus vulgaris*
This abundant year-round resident and migrant in the region is an abundant breeder in the edge habitats, hedgerows and open mixed and deciduous woods, residential and recreational areas of the park - wherever it can find natural or artificial cavities for nesting.

Solitary Vireo *Vireo solitarius*
This species is considered an uncommon migrant and a rare breeding species in the region. It occurs in the forests of the Rouge during migration.

Yellow-throated Vireo (C) * *Vireo flavifrons*
This species is a rare migrant and a rare breeder in the region. It has nested in the mature Black Maple-Sugar Maple stand east of Little Rouge Creek south of Steeles Avenue (Fairchild, pers. comm.), and may have occurred in the deciduous bottomlands south of Twyn Rivers during the 1990 breeding season.

Warbling Vireo (C) *Vireo gilvus*
This common migrant and breeding species in the region is a common breeder in the deciduous bottomland willow thickets and aspen groves of the Rouge.

Philadelphia Vireo *Vireo philadelphicus*
This regionally scarce migrant has occurred within the park boundaries (Fairchild, pers. comm.).

Red-eyed Vireo (C) *Vireo olivaceus*
This abundant migrant and breeding species in the region is a common breeder in the deciduous and mixed forests and woodlots of the Rouge.

Blue-winged Warbler *Vermivora pinus*
This increasing but regionally scarce spring and rare fall migrant and scarce breeding species has occurred in migration at the Metro Zoo (Moase, pers. comm.). Along with the Golden-winged Warbler, it formerly nested on the tablelands just east of Little Rouge Creek at Twyn Rivers Drive (Speirs, pers. comm.).

Tennessee Warbler *Vermivora peregrina*
This species is considered an "uncommon" migrant in the region by Bain and Henshaw (1990), and a "very common" migrant by Goodwin (1988) who notes that its numbers may increase greatly during spruce budworm outbreaks. It was a common spring migrant at the Rouge during the 1990 study.

Nashville Warbler *Vermivora ruficapilla*
This regionally common migrant is a common breeding species to the north and to the east of the Rouge Valley Park. At the Rouge there are records only for migration, although it should be looked for as an occasional breeder in the second growth of mixed forests and in wet coniferous woods (McLaren 1987).

Northern Parula *Parula americana*
This regionally scarce warbler occurs in migration in wooded areas of the Rouge Valley Park (pers. obs.).

Yellow Warbler (C) *Dendroica petechia*
This regionally abundant migrant and breeding species is an abundant breeder at the Rouge Valley Park's edge habitats near wet areas.

Chestnut-sided Warbler (P) * *Dendroica pensylvanica*
This regionally common migrant and common breeding species is a rare but regular probable breeder in the park's second growth. In 1990, it was found in a semi-mature deciduous tableland woodlot of Sugar Maple and Beech, and at an early-successional bottomland stand of Balsam Poplar.

Magnolia Warbler *Dendroica magnolia*
This abundant migrant in the region may breed and occurs rarely in summer. One was present near Little Rouge Creek just north of Highway 2 in mixed tableland woods until the first week of June 1990, but it was probably a lingering migrant.

Cape May Warbler *Dendroica tigrina*
This regionally scarce migrant occurs in spring and fall at the Rouge (pers. obs.).

Black-throated Blue Warbler (C) * *Dendroica caerulescens*
This common migrant is regionally rare in summer, although it formerly bred more commonly in the southernmost parts of Ontario (Fraser 1987). It apparently has been confirmed as breeding near the Finch Meander (City of Scarborough 1983), and a singing male was present on June 10, 1990 in suitable breeding habitat of wet mesic deciduous tableland forest. It should be looked for during breeding season in future years.

Yellow-rumped Warbler *Dendroica coronata*
This common spring and abundant fall migrant in the region occurs at the Rouge during migration.

Black-throated Green Warbler *Dendroica virens*
This regionally common migrant and scarce breeding species occurs during migration at the Rouge.

Blackburnian Warbler *Dendroica fusca*
This species is considered a regionally uncommon migrant by Bain and Henshaw (1990) and a common migrant by Goodwin (1988). It is a rare breeder in the region. At the Rouge it was a common migrant in 1990. Courtship behaviour was observed in mixed mid-succession woods south of the Finch Meander on May 29, but the pair was likely migrating through.

Pine Warbler (P) *Dendroica pinus*
This scarce spring and rare fall migrant and scarce breeding species in the region has been recorded in migration near Amos's Ponds, just east of the park boundary (P.N.F. 1978). A singing male was heard during the height of the 1991 breeding season in mature White Pines on the interfluvial tableland oak forests south of Twyn Rivers Drive. This suggests the species is probably a rare or occasional breeder in the park.

Palm Warbler *Dendroica palmarum*
This regionally uncommon spring and common fall migrant occurs at the Rouge during migration. There is one Christmas count record for this species (Speirs, pers. comm.).

Bay-breasted Warbler *Dendroica castanea*
This is a common migrant in the region and at the Rouge.

Blackpoll Warbler *Dendroica striata*
This species is considered a scarce spring and uncommon fall migrant by Bain and Henshaw (1990) and a "fairly common" migrant by Goodwin (1988). At the Rouge, during the 1990 study it was a fairly common spring migrant.

Black-and-white Warbler (P) * *Mniotilta varia*
This regionally common migrant and uncommon breeding species is a common migrant through the Rouge Valley Park. A singing male was present for at least five days in suitable breeding habitat (mixed early-succession valley slope forest near a White Pine plantation) during the second week of July 1990, and there are other records of probable breeding within or near the park boundaries (City of Scarborough 1983; T.F.N. 1981; Speirs, pers. comm.).

American Redstart (C) * *Setophaga ruticilla*
This is a regionally common migrant and breeding species. At the proposed Rouge Valley Park, it is an uncommon but widespread breeder at the edges of forests and woodlots, primarily in the open early-successional deciduous and mixed bottomland woods.

Worm-eating Warbler *Helmitheros vermivorus*
This very rare spring and autumn visitor to the region was recorded at the Rouge valley on September 2, 1938, and at Amos's Ponds on May 26, 1969 (Speirs 1974).

Ovenbird (P) * *Seiurus aurocapillus*
This species is considered a common spring and uncommon fall migrant, and a common breeding species in the region. At the Rouge it is an uncommon probable breeder, restricted to the more extensive tracts of Eastern Hemlock and moist Sugar Maple-Beech forests.

Northern Waterthrush *Seiurus noveboracensis*
This regionally common migrant and breeding species is a common migrant at the Rouge. A singing male was observed in suitable breeding habitat near the lower Rouge River marsh (in the understorey of wet bottomland deciduous forest of Manitoba Maple and Crack Willow) during the 1990 study, but this bird was probably a migrant.

Mourning Warbler (P) * *Oporornis philadelphia*
This species is considered a regionally uncommon migrant and breeding species by Bain and Henshaw (1990), and a "fairly common" migrant and breeding species by Goodwin (1988). Within the Rouge Valley Park it was a fairly common probable breeder during the 1990 study. It was found in a variety of edge habitats; riparian tangles, small woodland clearings with dense shrubbery, woodlot edges and raspberry patches. It was widespread, but most common at the bottomlands north and south of Twyn Rivers Drive along both the Rouge River and Little Rouge Creek.

Common Yellowthroat (P) *Geothylpis trichas*
This regionally common migrant and abundant breeding species is a widespread and common breeder low in the shrubbery and tall grasses of the Rouge's open wet areas.

Wilson's Warbler *Wilsonia pusilla*
This species is considered a regionally scarce spring and common fall migrant by Bain and Henshaw (1990) and a common migrant by Goodwin (1988). At the Rouge Valley Park it was a common late spring migrant for a short period during the 1990 study.

Canada Warbler * *Wilsonia canadensis*
This is a regionally common migrant and uncommon breeding species. Singing males were observed at several locations of suitable breeding habitat (wet bottomland mixed forests of Manitoba Maple or White Cedar), but territoriality was not confirmed during the 1990 study.

Scarlet Tanager (C) *Piranga olivacea*
This species is considered regionally uncommon as a spring migrant and summer breeder, and scarce in fall by Bain and Henshaw (1990). Goodwin (1988) considers it a common migrant and fairly common but inconspicuous breeding species in the Toronto area. Within the park boundaries it is a fairly common breeder in the more extensive and mature tracts of mixed and deciduous forests.

Northern Cardinal (C) *Cardinalis cardinalis*
This species is considered a regionally abundant year-round resident and breeding species. Within the park it is a common and widespread breeder in edge habitats, mid-succession woods, gardens with shrubbery and in orchards.

Rose-breasted Grosbeak (C) *Pheucticus ludovicianus*
This regionally common migrant and breeding species is a common breeder at the Rouge's edge habitats and in open deciduous and mixed woods where there is sufficient deciduous shrubbery for nesting.

Indigo Bunting (C) *Passerina cyanea*
This species is considered regionally uncommon as a migrant and breeding species by Bain and Henshaw (1990), but Goodwin (1988) calls it a common migrant and breeder. At the Rouge it is a fairly common breeder at forest and woodlot edges, riparian thickets and in open woods during the 1990 study.

Rufous-sided Towhee (P) *Pipilo erythropthalmus*
This is a regionally common migrant, breeding species and rare winterer. Within the park it is a fairly common but local probable breeding species at drier tableland locations with dense shrubbery and open fields, and has occurred in winter (Speirs, pers. comm.).

American Tree Sparrow *Spizella arborea*
This regionally abundant migrant and winterer is a common wintering species within the park boundaries (Harpley 1990).

Chipping Sparrow (C) Spizella passerina
This regionally common migrant and abundant breeding species is a fairly common breeder within the park boundaries, preferring fields and gardens with scattered trees (often conifers) for nesting.

Field Sparrow (C) *Spizella pusilla*
This common migrant and breeding species and rare winterer in the region is an uncommon and local breeder at the Rouge. It was found in regenerating fields (usually near conifer plantations) during the 1990 study.

Vesper Sparrow (C) *Pooecetes gramineus*
This regionally uncommon migrant and common breeding species is a common but local breeder in the hedgerows of the northern sections of the park.

Savannah Sparrow (C) *Passerculus sandwichensis*
This regionally common migrant, abundant breeding species and rare winterer is an abundant but local breeder in the park's abandoned and fallow fields.

Grasshopper Sparrow (C) * *Ammodramus savannarum*
This species is considered a rare migrant and common breeding species in the region by Bain and Henshaw (1990), and an uncommon breeding species with specific habitat requirements by Goodwin (1988). During the 1990 study, it was an uncommon and local breeder at the Rouge Valley Park, found only at the recently-disturbed young field west of the Beare Road landfill.

Fox Sparrow *Passerella iliaca*
This common spring and uncommon fall migrant and rare winterer in the region occurs in the Rouge's woodlands during migration (Fairchild, pers. comm.).

Song Sparrow (C) *Melospiza melodia*
This regionally abundant migrant, breeding species and uncommon winterer is an abundant breeder in the wetter edge habitats of the proposed Rouge Valley Park. It is an uncommon but regular wintering species at the Rouge (Harpley 1990).

Lincoln's Sparrow *Melospiza lincolnii*
This scarce migrant and rare breeding species in the region occurs during migration at the Rouge (Fairchild, pers. comm.).

Swamp Sparrow (P) *Melospiza georgiana*
This common migrant is considered a regionally abundant breeding species by Bain and Henshaw (1990) and a common breeder by Goodwin (1983). It is a common but local species within the park, probably breeding only at the lower Rouge River marsh.

White-throated Sparrow (P) * *Zonotrichia albicollis*
This is a regionally abundant migrant, uncommon breeding species and scarce winterer. During the 1990 study, it was an uncommon and local breeder in the mature White Cedar forest west of the Rouge River and south of Twyn Rivers.

White-crowned Sparrow *Zonotrichia leucophrys*
This common migrant and rare winterer in the region passes through the proposed Rouge Valley Park in migration.

Dark-eyed Junco *Junco hyemalis*
This common migrant and abundant winterer in the region is a common migrant and wintering species at the Rouge (Harpley 1990).

Lapland Longspur *Calcarius lapponicus*
This regionally common fall migrant, uncommon winterer and scarce spring migrant has been recorded at the Metro Zoo in winter (Fairchild, pers. comm.).

Snow Bunting *Plectrophenax nivalis*
This is considered an abundant wintering species and common migrant in the region by Bain and Henshaw (1990), and a fairly common migrant and winter visitor by Goodwin (1988). It occurs at the fields of the proposed Rouge Valley Park in migration and in winter (Harpley 1990, pers. comm.), sometimes in large flocks.

Bobolink (C) *Dolichonyx oryzivorus*
This regionally common migrant and is considered an abundant breeding species by Bain and Henshaw (1990), and a very common but local breeder by Goodwin (1988). At the Rouge it is a common but local breeding species in fallow and regenerating fields.

Red-winged Blackbird (C) *Agelaius phoeniceus*
This regionally abundant migrant and breeding species, and uncommon winterer is an abundant breeder in the wetter open country, edges, orchards and marshes of the Rouge Valley Park. In 1973, 326 nests were recorded in the lakeshore marshes, with 859 eggs or young on the nest (Wainio *et al.* 1973a).

Eastern Meadowlark (C) *Sturnella magna*
This common migrant and abundant breeding species in the region is a common breeder in the extensive open grassy areas of the Rouge Valley Park.

Common Grackle (C) *Quiscalus quiscula*
This abundant migrant and breeding species and scarce winterer in the region is an abundant breeder at the Rouge. It prefers edges, orchards, regenerating fields and gardens with scattered trees for breeding. It is quite regularly recorded in small numbers in winter within the park (Harpley 1990).

Brown-headed Cowbird (C) *Molothrus ater*
This regionally abundant migrant and breeding species and uncommon winterer is an abundant breeder at the proposed Rouge Valley Park, where it is found in a variety of habitats from fields, edges, orchards and gardens to open deciduous and mixed woods.

Orchard Oriole (P) ** *Icterus spurius*
This regionally rare migrant and provincial species of concern (Cadman 1990) is a rare but regular probable breeder in an orchard at the western edge of the Rouge Valley Park.

Northern Oriole (C) *Icterus galbula*
This common migrant and breeding species in the region is an abundant breeding species in edge habitats of the Rouge Valley Park. It requires taller deciduous trees near natural or manmade clearings for nesting.

Pine Grosbeak *Pinicola enucleator*
This irruptive winter visitor to the region has occurred at the Rouge Valley Park (Harpley, Fairchild, pers. comm.).

Purple Finch *Carpodacus purpureus*
This common migrant, uncommon breeding species and irruptive winterer in the region occurs irregularly in winter at the Rouge Valley Park (Harpley 1990).

House Finch (C) *Carpodacus mexicanus*
This common breeding newcomer is a year-round resident in the region. It is an uncommon breeding species at the Rouge Valley Park, though it is common in the residential areas of the periphery.

Red Crossbill *Loxia curvirostra*
This irruptive visitor and occasional breeder in the region (Lumsden and Smith 1987) has occurred in winter in conifer stands at the Rouge Valley Park (Fairchild, pers. comm.).

White-winged Crossbill *Loxia leucoptera*
This irruptive winter visitor and rare breeder in the region has been observed in winter in conifer stands within the park (Harpley, pers. comm.).

Common Redpoll *Carduelis flammea*
This irruptive winter visitor and irruptive migrant occurs irregularly at the Rouge Valley Park in winter (Harpley 1990).

Pine Siskin *Carduelis pinus*
This irruptive winter visitor, irruptive migrant and rare breeder in the region was a common migrant and possible breeder in conifer stands and plantations of the Rouge during the 1990 study.

American Goldfinch (C) *Carduella tristis*
This abundant migrant and breeding species and common winterer in the region is an abundant breeder in the fields, edges, hedgerows and orchards of the park.

Evening Grosbeak *Coccothraustes vespertinus*
This irruptive migrant and winterer in the region occurs irregularly at the park (Harpley 1990; Fairchild, Kerr, pers. comm.).

House Sparrow (C) *Passer domesticus*
This regionally abundant year-round resident and breeding species is a common breeder at the park, frequenting residential settings and the Metro Zoo.

Species Recorded Within 2 Kilometres of Park Boundary

Most of the following species have undoubtedly occurred within the current Rouge Valley Park boundaries, but no confirmed records have been found:

Red-throated Loon *Gavia stellata*
This rare visitor at any season to the region has been recorded on Lake Ontario near Petticoat Creek (it may have been visible from the mouth of the Rouge River as well) (P.N.F. 1990).

Horned Grebe *Podiceps auritus*
This regionally common migrant occurs quite regularly on Lake Ontario east of the mouth of the Rouge River (P.N.F. 1981, 1982).

Red-necked Grebe *Podiceps grisegena*
This scarce spring and rare fall migrant in the region occurs regularly at the western end of Lake Ontario and should be looked for from the mouth of the Rouge River.

Northern Goshawk *Accipiter gentilis*
This rare species in the region nested in 1967 (Speirs 1977) just east of the park boundary, and has occurred in spring at Amos's Ponds as recently as 1988 (P.N.F. 1988). It is to be expected most frequently in winter and during migration.

Gyrfalcon *Falco rusticolus*
This rare autumn through spring visitor to the region was observed near the Rouge in September, 1957 (Speirs 1977).

Merlin *Falco columbarius*
This species is rare in winter and spring in the region; it is to be expected most frequently with other hawks during fall migration.

Northern Bobwhite *Colinus virginianus*
This southern quail became quite common in the southern part of the region following European settlement. Harsh winters and human disturbance caused a southward retreat and the last record for the Rouge area was in 1951 (Speirs 1977).

Semipalmated Plover *Charadrius semipalmatus*
A common migrant in the region; to be expected at the lower Rouge River marsh, in wet fields, and along shallow ponds in open country.

Upland Sandpiper *Bartramia longicauda*
A record for Rouge Hill (Speirs 1977) exists for this regionally scarce migrant and breeder. Suitable habitat exists in the fields of the northern sections of the park and it should be expected occasionally there.

Whimbrel *Numenius phaeopus*
This migrant occurs commonly along Lake Ontario's north shore around May 24, and more rarely in fall. There are records of sizable flocks pausing less than one kilometre from the mouth of the Rouge River in spring (P.N.F. 1981).

Ruddy Turnstone *Arenaria interpres*
Flocks of this regionally common spring migrant should be looked for along Lake Ontario and in the wet fields of the northern section of the park. It is a scarce fall migrant in the region.

Northern Hawk Owl *Surnia ulula*
This rare and irregular winter visitor to the region from the north has been found very close to the park's eastern boundary on at least two occasions (Speirs 1974).

Three-toed Woodpecker *Picoides tridactylus*
This very rare (formerly irruptive) winter visitor to the region appeared once near the eastern boundary of the park (Speirs 1976).

Acadian Flycatcher *Empidonax virescens*
This very rare visitor to the region has bred in Pickering not far from the park's northeastern border, and it has been heard within the park's boundaries (Fairchild, Harpley, pers. comm.).

Gray Jay *Perisoreus canadensis*
This very rare visitor to Southern Ontario has occurred in winter near the Rouge Valley Park's eastern boundary (Speirs 1975).

Tufted Titmouse *Parus bicolor*
There are records for Pickering (Speirs 1975) and for the Meadowvale and Ellesmere area (Fairchild, pers. comm.). This provincially-rare breeder may be expected as an occasional visitor and potential breeder along the deciduously-forested residential borders of the lower Rouge River marsh. Most regional records are for similar settings along the western shores of Lakes Erie and Ontario (Currie 1987).

Mountain Bluebird *Sialia currucoides*
A female of this extremely rare western visitor and new breeding species in the province (Risley 1987) is reported to have visited the Reesor Road and Steeles Avenue area in the early 1980s (Fairchild, pers. comm.).

Golden-winged Warbler *Vermivora chrysoptera*
This declining and regionally scarce migrant and breeding species formerly bred, along with the Blue-winged Warbler, on the tableland just east of Little Rouge Creek at Twyn Rivers Drive.

Orange-crowned Warbler *Vermivora celata*
This rare spring and scarce fall migrant in the region has occurred near the park's eastern boundary (Speirs, pers. comm.).

Yellow-throated Warbler *Dendroica dominica*
An individual of this extremely rare spring and fall visitor to the region was at Pickering Townline and Concession 3 on May 18, 1989 (Bain and Henshaw 1990).

Connecticut Warbler *Oporornis agilis*
This regionally rare migrant has been recorded near the park's eastern boundary (Speirs 1974).

Prairie Warbler *Dendroica discolor*
This regionally rare migrant and provincially rare breeder (Cadman 1990) has occurred near the park's eastern boundary (Speirs 1974).

Cerulean Warbler *Dendroica cerulea*
This rare spring migrant and rare breeding Carolinian species is a provincial species of concern (Cadman 1990). It has occurred in spring near Amos's Ponds (Speirs, pers. comm.).

Prothonotary Warbler *Protonotaria citrea*
This regionally rare migrant and provincially rare breeding species (Cadman 1990) has occurred in migration at Amos's Ponds, just east of the park (Speirs 1974).

Yellow-breasted Chat *Icteria virens*
This is a regionally rare migrant and very rare breeder in the Toronto area (Goodwin 1988; Eagles 1987). A territorial male was present in the Highland Creek area through the 1990 breeding season, and this species may be expected at the Rouge as a rare migrant and potential breeder.

Western Meadowlark *Sturnella neglecta*
This provincial species of concern (Cadman 1990) has bred just east of the park as recently as the mid-1980s (O.N.R.S.; Cranmer-Byng, pers. comm.).

Brewer's Blackbird *Euphagus cyanocephalus*
This very rare migrant and year-round visitor to the region has occurred at Amos's Ponds just east of the park boundary (Fairchild, pers. comm.).

APPENDIX C: MAMMALS OF THE ROUGE VALLEY PARK

Twenty-seven mammal species occur in the wild in the Rouge Valley Park. One other is a tentative occurrence, one has wandered into the park from far afield, and two species are recently extirpated. Eleven of the extant species are considered rare or uncommon in Metro Toronto. Records are largely based on incidental observations during surveys carried out in the 1970s and 1980s (Wainio *et al.* 1973a, M.T.R.C.A. 1982, City of Scarborough 1983). P. Harpley (1982a,b), M. Stabb, and C.D.H. Clarke provided valuable observations on mammals in the park. Intensive mammal surveys were carried out in several field habitats by the Royal Ontario Museum in 1980. An ongoing survey of the Rouge River valley south of the Zoo, is being carried out by P. de Groot under the auspices of the Metro Toronto Zoo and the Royal Ontario Museum (de Groot and Carvio 1990).

Pygmy Shrew *Sorex hoyi*

Rare or uncommon in Metro Toronto, the only park location for this shrew is in the Rouge valley south of the Metro Zoo (P. de Groot, 1990, Z9).

Northern Short-tailed Shrew *Blarina brevicauda*

Common in the park. Several were trapped in 1973 (Wainio *et al.* 1973a); others have been sighted by Riley in the 1980s; and, in 1990, it was recorded in the Rouge valley south of Metro Zoo (P. de Groot, photograph, 1990, Z5-8,14,15).

Hairy-tailed Mole *Parascalops breweri*

Rare or uncommon in Metro Toronto, this mole has been recorded at two locations in the park: found dead on an interfluvial ridge trail through a dry Red Oak White Oak forest south of Tywn Rivers Drive (S.M. Woodward, 1990, ROM 98217), and in the Rouge River valley south of the Metro Toronto Zoo (P. de Groot, 1990, Z13).

Star-nosed Mole *Condylura cristata*

Common in the park, dead specimens were found south of Highway 401 (Wainio *et al.* 1973a) and by P. Harpley in 1982 on the interfluvial tableland south of Tywn Rivers Drive (Harpley 1982b). The Scarborough ESA study (City of Scarborugh 1983) found this mole in the Sewells Forest East, Beare Road Woodlot, Sewells Forest West and Cedarbrae Woods ESAs.

Keen's Bat *Myotis keenii*

Rare or uncommon in Metro Toronto, the only park location for this bat is in the Rouge valley south of Metro Zoo (P. de Groot, 1990, photograph).

Hoary Bat *Lasiurus cinereus*

Rare or uncommon in Metro Toronto, the only park location for this bat is in the Rouge valley south of Metro Zoo (P. de Groot, 1990, photograph, Z1).

Black Bear *Ursus americanus*

In 1991, a two-year old male bear was sighted in the Rouge watershed near Markham and in the park at the Metro Zoo. It was captured on a construction site in West Hill on June 1, and relocated north.

Eastern Cottontail *Sylvilagus floridanus*

Common throughout the park.

Snowshoe Hare *Lepus americanus*

This hare was observed in the Morningside Creek, Barkey Woods, and Sewells Forest East ESAs (the tableland woodlot east of Sewells Road and north of the CPR line) in 1983 (City of Scarborough 1983).

Eastern Chipmunk *Tamias striatus*
Common throughout the park (S.L. Thompson, 1921, ROM 32127).

Woodchuck *Marmota monax*
Common throughout the park. In 1973, 277 woodchuck holes were recorded in the lower valley south of Highway 401 (Wainio *et al.* 1973a).

Gray Squirrel *Sciurus caroliniensis*
Common throughout the park.

Red Squirrel *Tamiasciurus hudsonicus*
Common throughout the park, particularily in the mixed and conifer forests (A.W.F. Banfield, 1939, ROM 23012; G. Beare, 1938, ROM 83911).

Northern Flying Squirrel *Glaucomys sabrinus*
Rare or uncommon in Metro Toronto, this flying squirrel was observed by Mark Stabb in 1986 at two park locations: a hole in a White Pine on a high valley terrace of Hemlock - Sugar Maple on the east side of Little Rouge Creek south of Twyn Rivers Drive; and a hole in an old Large-toothed Aspen abutting a field on the east side of the Rouge River valley just north of Twyn Rivers Drive.

Beaver *Castor canadensis*
Rare or uncommon in Metro Toronto, and known from the park area occasionally up to 1972 (Wainio *et al.* 1973a). A bank lodge and 6 beavers were again observed by J.L. Riley in 1980 on the river near the lakeshore marsh. Since then, they have persisted and, in 1990, S. Varga also observed a beaver feeding at the Rouge River mouth.

White-footed Mouse *Peromyscus leucopus*
This species was trapped, but not collected, in 1973 in the valley south of Highway 401 (Wainio *et al.* 1973a). It was also recorded in 1982 for the Morningside Creek and Rouge River valley area west of the Metro Zoo, Cedarbare Woods, Sewells Forest East, and Sewells Forest North ESAs (City of Scarborough 1983). It is difficult to separate in the field from the Deer Mouse, and is considered a tentative record until confirmed by a voucher.

Deer Mouse *Peromyscus maniculatus*
Common throughout the park (J. Gibson, C. Elion, R. Jorgensen, 1982, ROM 87985, 87986, 87990, 87991, 87992, 87993, 87994, 87995, 87996, 87997, 87998, 87999, 88005, 88006, 88007).

Meadow Vole *Microtus pennsylvanicus*
Common in the park (J. Gibson, C. Elion, R. Jorgensen, 1982, ROM 87988, 87989, 88000, 88001, 88002, 88003, 88004, 88009).

Muskrat *Ondatra zibethicus*
Common in the park, particularily in the lakeshore marsh (Wainio *et al.* 1973a).

Meadow Jumping Mouse *Zapus hudsonius*
Common in the park (J. Gibson, C. Elion, R. Jorgensen, 1982, ROM 87983, 87984, 87987, 88008).

Porcupine *Erethizon dorsatum*
A northern species at the limit of its range just north of Metro Toronto, it was observed as an infrequent visitor in the 1960s by area residents around the lakeshore marsh (Wainio *et al.* 1973a). It was not observed during the studies carried out in the 1970s or 1980s.

Coyote *Canis latrans*
Rare or uncommon in Metro Toronto, the coyote is widespread in the park.

Red Fox *Vulpes vulpes*
Common in the park.

Raccoon *Procyon lotor*
Common in the park.

Ermine *Mustela erminea*
Rare or uncommon in Metro Toronto, the ermine was sighted by P. Harpley in 1981 in the Morningside Creek valley (Harpley 1982b), and by P. de Groot in 1990 in the Rouge River valley south of the Metro Zoo (de Groot and Carvio 1990).

Long-tailed Weasel *Mustela frenata*
Rare or uncommon in Metro Toronto, this weasel was sighted by P. de Groot in the Rouge River valley south of the Metro Zoo (de Groot and Carvio 1990).

Mink *Mustela vison*
Rare or uncommon in Metro Toronto, this species of wetlands was observed by C.D.H. Clarke (pers. comm. to J.L. Riley) in the Rouge valley during the early 1980s.

Striped Skunk *Mephitis mephitis*
Once common in Metro Toronto, the skunk appears to be declining, possibly due to competition with racoons. P. de Groot did not find skunks during an intensive mammal survey in the Rouge Valley south of the Metro Zoo. It was observed in 1982 at Morningside Creek (City of Scarborough 1983) and there are a number of other sightings in the park during the 1980s.

River Otter *Lontra canadensis*
Extirpated from Metro Toronto, the otter was present on the Rouge River until the mid-1950s (C.D.H. Clarke, pers. comm. to J.L. Riley).

White-tailed Deer *Odocoileus virginianus*
Rare or uncommon in Metro Toronto, White-tailed Deer are common in the park, especially north of Twyn Rivers Drive. (Harpley 1982a). Before bridge construction at Highway 401 (1972-73), deer followed the river south to the lake, but they are not now seen south of Highway 401.

APPENDIX D: AMPHIBIANS AND REPTILES OF THE ROUGE VALLEY PARK

Nineteen reptile and amphibian species are resident in the wild in the Rouge Valley Park. One other is considered recently extirpated. Seven extant species are considered rare or uncommon in Metro Toronto. Records are based largely on those of Bob Johnson of the Metro Toronto Zoo, who is carrying out an inventory of Metro Toronto's herpetofauna. Additional information is available from three previous studies carried out in the park during the 1970s and 1980s (M.T.R.C.A. 1982, Wainio *et al.* 1973a, City of Scarborough 1983). Incidental observations by the authors, and by Jim Fairchild and Paul M. Catling, have also been included.

Mudpuppy *Necturus maculosus*
Rare in Metro Toronto and rare in the park; known from two locations, one sighting in 1991 in the Rouge River just south of Steeles Avenue, and a second sighting in 1990 in the Little Rouge Creek near the Meadowvale Road bridge (B. Johnson, pers. comm.)

Eastern Newt *Notophthalmus viridescens*
Common in southern Ontario, this newt is uncommon in Metro Toronto and rare in the park with only three 1990 locations: mesic deciduous terrace forests on the west side of the Little Rouge Creek, east of the Metro Zoo; in a cattail marsh on Metro Zoo's network of built ponds; and along a small tributary stream on either side of Reesor Road, north of the CPR line.

Blue-spotted Salamander *Ambystoma laterale*
Rare in Metro Toronto and rare in the park. This salamander is known from a single location in 1990 in the Little Rouge Creek on the grassy slopes down to the former Valhalla Estate (B. Johnson, pers. comm.). Several nearby ephemeral ponds on the valley terrace may serve as breeding ponds.

Yellow-spotted Salamander *Ambystoma maculatum*
Rare in Metro Toronto and extirpated from the park. Johnson (1983) notes that no viable populations remain in Metro Toronto. This salamander was sighted in wetlands under the hydro corridor on the west side of Meadowvale Road just south of the Rouge River valley in the 1960s (B. Johnson, pers. comm.) These wetlands were subsequently filled in between 1967 and 1968.

Eastern Redback Salamander *Plethodon cinereus*
Common in the park, but uncommon in Metro Toronto (Johnson 1983). It is known from several mature deciduous forest sites including the Core Woods at the Metro Zoo (M. Oldham, pers. comm. 1980) and, in 1990, on relict terraces on the east side of the Rouge south of Finch Avenue. In the spring of 1991 Bob Johnson found 10 large individuals under a single rotting log on a wooded valley slope in the Little Rouge just east of Meadowvale Road and Finch Avenue.

American Toad *Bufo americanus*
Common throughout the park in a variety of habitats.

Tetraploid Gray Treefrog *Hyla versicolor*
Common in the park, but considered uncommon in Metro Toronto, with the Rouge sustaining Metro's only stable population (Johnson 1983). It is known from four woodland locations in the Rouge Valley between Finch Avenue and Meadowvale Road and in the Little Rouge Creek valley north of Twyn Rivers Drive. Two breeding ponds are known, one in a cattail marsh at the Metro Zoo, and a second on a valley terrace pond on the east side of Little Rouge Creek (B. Johnson, pers. comm.)

Western Chorus Frog *Pseudacris triseriata*
Common in the park, and known from three locations along the Rouge River and in the Townline Swamp (Johnson 1983).

Wood Frog *Rana sylvatica*
Common in the park, this frog is known to breed in ponds on a valley terrace east of Little Rouge Creek, and on a terrace south of Finch Avenue, east of the Rouge River (B. Johnson, pers. comm.)

Northern Leopard Frog *Rana pipiens*
Common in the park, with breeding ponds known in the Rouge lakeshore marsh, Townline Swamp and just outside the park at the Amos Pond and Centennial Forest and Swamp (B. Johnson, pers. comm.)

Green Frog *Rana clamitans*
Common in the park. Jim Fairchild (pers. comm.) has noted a decline in numbers for the Little Rouge Creek since the 1950s, which may be associated with declining water quality.

Common Snapping Turtle *Chelydra serpentina*
Common in the park, especially in the Rouge lakeshore marsh. Nests were found on a sandy knoll among homes on the west side of the lakeshore marsh and on a gravelbar of the Rouge River (B. Johnson, pers. comm.) A hibernaculum was also found in 1990 by B. Johnson in a cattail seepage area near Little Rouge Creek.

Painted Turtle *Chrysmys picta*
Common in the park, especially in the Rouge lakeshore marsh.

Map Turtle *Graptemys geographica*
Rare in Metro Toronto and rare in the park. This wary turtle is known from three locations: in a pond on Little Rouge Creek just below an old dam near Steeles Avenue (Jim Fairchild, pers. comm., 1990); in Little Rouge Creek just below the Meadowvale Road bridge; and in 1986, in a channel in the Rouge lakeshore marsh (B. Johnson, pers. comm.)

Blanding's Turtle *Emydoidea blandingi*
Rare in Metro Toronto and rare in the park. This turtle is known from three locations: a cattail marsh and pond in a former gravel pit at the Metro Zoo just east of the Rouge River (B. Johnson, pers. comm.); the Rouge lakeshore marsh (M.T.R.C.A. 1982); and in 1990, a road kill of an egg-laying female on the west side of Reesor Road south of the CPR line (B. Johnson, pers. comm.)

Common Garter Snake *Thamnophis sirtalis*
Common throughout the park, with hibernacula known along the CPR line at Sewells Road, near the Rouge River at the Meadowvale Road bridge, and around a building east of Meadowvale Road (B. Johnson, pers. comm.)

Northern Water Snake *Nerodia sipedon*
Rare in Metro Toronto and rare in the park. This snake was sighted in 1973 in the Rouge lakeshore marsh (Wainio *et al.* 1973a), and in 1990 in Little Rouge Creek just south of Tywn Rivers Drive (B. Johnson, pers. comm.)

Redbelly Snake *Storeria occipitomaculata*
Common in the park, Bob Johnson observed these snakes basking in the fall and spring on Reesor Road. Road kills of up to 15 individuals were noted at this site. In the summer they were observed feeding in the fields east of Reesor Road and north of Finch Avenue. In the fall they migrate across Reesor Road to the tableland woodlots fringing the Rouge River valley.

Brown Snake *Storeria dekayi*
Common in the park, and known from the same hibernacula as those for the Common Garter Snake.

Milk Snake *Lampropeltis triangulum*
Common in the park, mostly associated with the farms in the northern half of the park. Bob Johnson has observed a number of roadkills on Reesor Road, and Paul M. Catling sighted a Milk Snake in grassy meadows north of the Rouge lakeshore marsh in 1980. A hibernaculum is known in the foundations of a building east of Meadowvale Road.

APPENDIX E: FISH OF THE ROUGE VALLEY PARK

Fifty-five fish species have been recorded in the Rouge Valley Park. Two of these species, Redside Dace and Stoneroller, are considered nationally and provincially vulnerable. Records are based on the 1984 to 1985 survey of Robert J. Steedman (RJS) for the Rouge River (R), Little Rouge Creek (L), and Morningside Creek (M), all in the park north of Highway 401 (Steedman 1987). Five surveys have been carried out in the Rouge lakeshore marsh (Ma): in 1973 by J.L. Riley (JLR) (Wainio *et al.* 1973a, Riley 1978); in 1974-75 by the Ontario Ministry of Natural Resources (MNR1) (Macnab and Hester 1976); in 1983 and 1984 by the Metropolitan Toronto and Region Conservation Authority (MT) (Snowden 1983, 1984); in 1984 and 1985 by Tasha D. Stephenson (TDS) (Stephenson 1988); and in 1989, 1990 and 1991 by the Ontario Ministry of Natural Resources (MNR2) (Buchanan and Bianchi 1992). The MNR surveys also included the shore of Lake Ontario at the Rouge River mouth. Spawning species and those with young of the year are noted for the lakeshore marsh, based on Stephenson (1988) and (Buchanan, pers. comm.). An additional seven fish species are known to occur in the Rouge River watershed upstream of the park.

Legend:

Locations: R - Rouge River, L - Little Rouge Creek, M - Morningside Creek, Ma - Rouge lakeshore marsh

Common Name	**Species**	**Locations**	**Spawning Adults (S), Young of the Year (Y) present in the lakeshore marsh**
Sea Lamprey	*Petromyzon marinus*	R,L - RJS, Ma - JLR, MT	
Bowfin	*Amia calva*	Ma - JLR, MNR1,2, TDS	SY
Alewife	*Alosa pseudoharengus*	Ma - MNR1,2, TDS	Y
Gizzard Shad	*Dorosoma cepedianum*	L - RJS, Ma - JLR, MNR1,2, TDS, MT	SY
Coho Salmon	*Oncorhynchus kisutch*	Ma - MNR1	
Chinook Salmon	*Oncorhynchus tshawytscha*	Ma - MNR2, MT	
Rainbow Trout	*Oncorhynchus mykiss*	R,L - RJS, Ma - JLR, TDS, MNR2	
Brown Trout	*Salmo trutta*	L -TDS, Ma - JLR, MNR2, MT	
Round Whitefish	*Prosopium cylindraceum*	Ma - MNR1	
Rainbow Smelt	*Osmerus mordax*	Ma - MNR1,2	
Central Mudminnow	*Umbra limi*	L -TDS, Ma - TDS	Y
Northern Pike	*Esox lucius*	Ma - JLR, MNR1,2, TDS, MT	SY
Goldfish	*Carassius auratus*	Ma - MNR2	Y
Redside Dace	*Clinostomus elongatus*	R - RJS, L - OMNRS 1974, M - RJS	
Lake Chub	*Couesius plumbeus*	R,L - RJS, Ma - MNR1, MT	
Carp	*Cyprinus carpio*	R,L - RJS, Ma - JLR, MNR1,2, TDS, MT	SY
Stoneroller	*Campostoma anomalum*	L - RJS, ROM 5267, Ma - TDS	
Hornyhead Chub	*Nocomis biguttatus*	R,L - RJS	
Golden Shiner	*Notemigonus crysoleucas*	Ma - MNR1,2, TDS, MT	SY
Emerald Shiner	*Notropis atherinoides*	Ma - MNR1,2, TDS, MT	Y
Common Shiner	*Luxilus cornutus*	R,L,M -RJS, Ma - MNR1,2, TDS, MT	SY
Spottail Shiner	*Notropis hudsonius*	R,L - RJS, Ma - MNR1,2, TDS, MT	SY
Rosyface Shiner	*Notropis rubellus*	R - RJS, Ma - MNR1,2	
Spotfin Shiner	*Cyprinella spiloptera*	Ma - MNR1	
Sand Shiner	*Notropis stramineus*	Ma - MNR1,2, MT	
Mimic Shiner	*Notropis umbratilis*	Ma - MT	
Bluntnose Minnow	*Pimephales notatus*	R,L,M - RJS, Ma - MNR1,2, TDS, MT	SY
Fathead Minnow	*Pimephales promelas*	R,L - RJS, Ma - MNR1,2, TDS, MT	SY

Common Name	**Species**	**Locations**	**Spawning Adults (S), Young of the Year (Y) present in the lakeshore marsh**
Blacknose Dace	*Rhinichthys atratulus*	R,L,M - RJS	
Longnose Dace	*Rhinichthys cataractae*	R,L,M - RJS, Ma - MNR1	
Creek Chub	*Semotilus atromaculatus*	R,L,M - RJS, Ma - MNR1, TDS	
White Sucker	*Catostomus commersoni*	R,L,M - RJS, Ma - JLR, MNR1,2, TDS, MT	Y
Brown Bullhead	*Ameiurus nebulosus*	R - RJS, Ma - JLR, MNR1,2, TDS, MT	Y
Stonecat	*Noturus flavus*	R,L - RJS	
Tadpole Madtom	*Noturus gyrinus*	Ma - TDS	Y
American Eel	*Anguilla rostrata*	Ma - MNR1, JLR	
Banded Killifish	*Fundulus diaphanus*	Ma - MNR1	
Threespine Stickleback	*Gasterosteus aculeatus*	Ma - MNR1	
Trout-perch	*Percopsis omiscomaycus*	Ma - MNR2, MT	
White Perch	*Morone americana*	Ma - MNR1,2, TDS,MT	S
White Bass	*Morone chrysops*	Ma - JLR, MNR1, TDS	
Rock Bass	*Ambloplites rupestris*	R,L - RJS, Ma - JLR, MNR1,2, TDS, MT	Y
Pumpkinseed	*Lepomis gibbosus*	R,L - RJS, Ma - JLR, MNR1,2, TDS, MT	SY
Bluegill	*Lepomis macrochirus*	Ma - MNR2	
Smallmouth Bass	*Micropterus dolomieui*	R,L - RJS, Ma JLR, MNR1,2, TDS, MT	
Largemouth Bass	*Micropterus salmoides*	R - RJS, Ma - MNR1,2, TDS, MT	SY
Black Crappie	*Pomoxis nigromaculatus*	R,L - RJS, Ma - MNR1,2, TDS, MT	SY
Yellow Perch	*Perca flavescens*	Ma - JLR, MNR1,2, TDS, MT	SY
Walleye	*Stizostedion vitreum*	Ma - MNR2	
Rainbow Darter	*Etheostoma caeruleum*	R,L,M - RJS	
Johnny Darter	*Etheostoma olmstedi*	R,L,M - RJS, Ma - MNR1,2, TDS, MT	SY
Logperch	*Percina caprodes*	R,L - RJS, Ma - MNR1,2, MT	
Freshwater Drum	*Apolodinotus grunniens*	Ma - MNR1,2	
Slimy Sculpin	*Cottus cognatus*	Ma - MNR1	

Additional fish species found in the Rouge River watershed upstream of the park

American Brook Lamprey	*Lampetra lamottei*	R - RJS
Brook Trout	*Salvelinus fontinalis*	R,L - RJS
Northern Redbelly Dace	*Chrosomus eos*	R - RJS
Brassy Minnow	*Hybognathus hankinsoni*	R - RJS
Brook Stickleback	*Culaea inconstans*	M - RJS, within 0.5 kms of the park
Iowa Darter	*Etheostoma exile*	R - RJS
Mottled Sculpin	*Cottus bairdi*	R,L - RJS

APPENDIX F: FIELD METHODS

The botanical fieldwork consisted of systematically cruising the study area to ensure a thorough survey of significant plant species and all community types. Within each community, species lists were compiled for the tree, sapling, shrub and herbaceous layers. Environmental parameters such as soil type, soil moisture, microclimate, slope aspect and degree, and extent of disturbance were noted. Fieldwork was carried out over 66 days between 1988 and 1991 (1988: June 29, July 7, 13, 18 and 27, August 31, September 1, 22 and 29; 1989: July 12, 14, 20-22, 28 and 31, August 3-5, 11, 16, 17, 24-26, September 11, October 28, 31, November 5, 6, 9-13, 15, 20, 26 and 27, 1990: May 6, 8, 17, 23, 24, 26, 30 and 31, June 4, 7, 9, 19-22, 25, 27 and 29, July 5-8, September 27-29, October 3; and 1991: August 19). In addition, previous studies by Riley (Wainio *et al.* 1973a, Riley 1978, 1980, Riley *et al.* 1981), Kaiser and Copeland (1974), the Metro Toronto and Region Conservation Authority (1982), the City of Scarborough (1983), Varga (1984; for point-quarter method for quantitative studies, refer Maycock 1963), and Robert Jackson (pers. comm. 1991) were incorporated into this study. The vascular plant herbarium at the Royal Ontario Museum (TRT) was also searched for recent and historical collections on the Rouge.

Fish, mammal, reptile, and amphibian records are based on incidental observations carried out during this study, previous studies (Wainio *et al.* 1973a, M.T.R.C.A. 1982, City of Scarborough 1983) and the observations of Mark Stabb, the late C.D.H. Clarke, Jim Fairchild, Paul M. Catling, and Paul Harpley. More detailed surveys were also included for mammals (P. de Groot and Carvio 1990,), reptiles and amphibians (Johnson 1983, pers. comm. 1991), and fish (Steedman 1987, Stephenson 1988, Wainio *et al.* 1973a, and Macnab and Hester 1976). A search was also made of historical and recent mammal collections at the Royal Ontario Museum.

Determination of the historic landscapes in the park involved a systematic search through historic photographs, aerial photographs, and maps at the Ontario Archives; the Map Library, Robart's Library, University of Toronto; and the National Archives Photo Library. The Ontario Land Survey records at the Lands and Survey Branch, Ontario Ministry of Natural Resources were also consulted.

Avifauna studies included the assembly of current and historical information on the breeding birds of the Rouge (Connell and Norman 1988, Szuba and Norman 1988, Spiers 1974-1979, Wainio *et al.* 1973a, Cadman *et al.* 1987, Riley *et al.* 1991, Riley and Gould 1989, Bain and Henshaw 1990, Goodwin 1988, the Ontario Nest Records Scheme, the Toronto and Pickering Field Naturalists newsletters, City of Scarborough 1983, M.T.R.C.A. 1982, and many other sources). Many individuals contributed their observations; Paul Harpley, Murray Speirs, Martin Geleynse, Mike Cadman, Sandy Connell, Jack Cranmer-Byng, Jim Fairchild, Jim Robb, Luc Fazio, Jim Garrett, Brian Henshaw, Harry Kerr, John Leonard, and Phil Taylor.

Extensive daytime searches for raptors and early breeding species were made during the first three and a half weeks of May 1991, including stick-nests, tree cavities, whitewash, kills, moulted feathers, or agitated crows and jays. Pre-recorded calls of Red-shouldered Hawks were played in ideal habitat and at historical nesting sites (Szuba and Norman 1988). Daytime searches also included visits to pine plantations and conifer stands in search of Cooper's Hawk, Sharp-shinned Hawk, Long-eared Owl and other uncommon raptors, or evidence of their presence.

Tree cavities were examined or, when holes were inaccessible, trees were tapped to locate Eastern Screech Owl, Northern Saw-whet Owl or flying squirrels. At night, pre-recorded taped calls of Eastern Screech Owl, Long-eared Owl, Barred Owl, Northern Saw-whet Owl and Great Horned Owl were played in areas of suitable habitat.

Evidence of breeding by raptor and other early species was noted, as were incidental observations of migrants. All visual and heard observations, and all nest-search routes and tape playing routes were mapped on air photos and on a 1:7,500 base map, and their length and duration noted, as were weather conditions and time of day. This project did not commence until May 4, and the areas north of the CPR line to Steeles Avenue were not considered until the fourth week of May. As a result, raptor data are less complete than for other species.

Beginning May 23, 1990, all birds seen or heard within the study area were counted. Evidence of breeding was recorded using standard breeding bird atlas codes (Cadman *et al.* 1987). Habitats were described in terms of mapped vegetation communities. All significant observations were mapped onto mylar overlays on 1:10,000 aerial photos. Most censusing was done between 04:30 and 11:00 a.m. Some evening visits were also made. An effort was made to cover marsh and heavily wooded areas at the earliest hours, when species in such habitats tended to be most vocal. Fields and edge locales were generally visited during the later hours.

When an area was visited for a second, third or fourth time, new routes were walked, or original routes were walked in the opposite direction, so as to cover all areas during the optimal three hours after sunrise, and so as to increase the probability of finding the more secretive species. An effort was made to cover the entire Rouge Valley Park with census routes which at the completion of the study would be no more than 150 metres apart at any point except where there were cultivated fields, inaccessible private property, or altered habitats such as the animal enclosures and public areas of the Metro Zoo.